THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

Importations of steel are increasing and promise to be steadily larger in the next few months. Another noteworthy development of the past week is the resumption of selling by some of the Southern furnaces that withdrew from the market early in March. The feature of the situation that still calls for comment is the sustained volume of buying in all lines in spite of the fully sold, and in some cases oversold, condition of producers, in respect to their output for 1902. The imports of pig iron for this year may not show any marked increase over the current rate, though orders are still being placed abroad, for both foundry and Bessemer irons, but the inward movement of steel promises to assume considerably larger proportions. In the Chicago district in the past week sales of 20,000 tons of German billets are reported, and the first 1,000 tons of a previous order of 10,000 tons was received. All this steel is to come from Antwerp by way of New Orleans. On a low through freight rate the steel is laid down in Chicago at $1 to $2 below the price of domestic steel in the Pittsburg district. The Pittsburg market for domestic steel is now $33 to $34, though German steel has been sold in the week at $32.50 delivered at Pittsburg, and $33 is the delivered price of German sheet bars. The independent sheet mills seem, with one or two exceptions, to have had a supply of steel up to this time, and through the purchase of steel plant or of billets at home, or through contracts with foreign producers have provided in part for their supply in the second half of the year. At all events the light sheet market, while steady, does not show the buoyancy apparent in other lines. Supply appears to be entirely equal to present demand. The pig iron situation finds some slight relief in the resumption of selling by one important Southern interest. The basis is $16, Birmingham, for No. 2 foundry iron, or $4 above the fictitious basis which has been written about for some weeks without being written down on contracts. Another Southern interest that has been out of the market for some weeks will remain out, being entirely sold up for this year. About September 1 this company expects to be in position to book iron for shipment next year. Actual transactions in foundry iron show that consumers are short on current requirements and are willing to pay high prices for enough iron to get out their contracts. There has been steady buying the past week for the second half of the year and $20 to $21 at Central Western furnace for No. 2 represents the range for these forward deliveries. The decision of the anthracite miners has not been made at this writing. There has been some accumulaton of stock by furnaces using anthracite fuel in part, but a prolonged strike would mean an increased demand for coke from these furnaces, to which under present conditions the coke districts might not be able to respond. The furnace workers in the Mahoning and Shenango Valleys are likely to leave their work on June 1. The operators will not—and could not if they would—grant the demand for 8-hour shifts and whether the strike be long or short depends on the sort of compromise the men are willing to make. The finished material markets are generally active. Structural material has sold in considerable lots for next year, and plates involved in structural contracts are sold for the same delivery, but plate mills are either unable or unwilling to make new plate contracts. However, it is believed no change in price will be made at the meeting this week. Chicago reports the sale in that district of 10,000 tons of Belgian rails for delivery this year. The turning of the Ohio works at Youngstown on to rails will relieve the situation so that additional November and December tonnage from domestic mills may yet be available.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, May 14.

There have been further advances in the price of Bessemer iron during the week, and inasmuch as practically the entire supply available through the remainder of the year is now in the hands of merchants and brokers further advances may be looked for. A sale of 1,000 tons at $21.25 at the furnace, for delivery through the months of June, July and August, made this week, establishes the new high record and already a number of brokers are asking an advance of 25 cents above this price. Bessemer billets are also following Bessemer iron upward and small sales have been made during the week at $34. In every case, however, the billets were for immediate shipment, as all the consumers that can afford to wait one to two months for deliveries are beginning to turn to the German market for relief. The inquiry for foreign steel grows greater daily and consumers are beginning to figure on requirements for the second half of the year. The German market, based on Pittsburg delivery prices, is far below the domestic, a sale of 1,000 tons of foreign billets having been made at $32.50, delivered, while one lot of 500 tons of sheet bars was also sold at $33 Pittsburg.

In finished lines the market continues extremely firm in all kinds of material. The largest producer of structural material continues to take large orders for shapes of all kinds for next year's deliveries together with the accompanying plate orders required. However, no contracts for tank plate outside of those accompanied by structural specifications have yet been taken and there is every indication that it will be some time before the plate books will be opened for 1903 business. Standard section rails continue in big demand, and as high as $32 to $32.50 has been paid for good quality relayers.

One of the strikes that has been causing considerable delay and annoyance in this district, especially where new plants were under erection, has been settled and the men returned to work this week. A compromise was effected by the structural iron workers with the American Bridge Co., the former accepting the bridge company's last offer which provides for an advance in wages and shorter hours. The strike in the Valleys among the furnace employes is still brewing and several days ago the furnace operators received an official notification from this organization that unless the eight-hour day was granted the top fillers and iron carriers on June 1 a strike would be declared. No formal action has been taken on this official notification inasmuch as the operators some time ago decided to refuse the demands of the men for a shorter day.

The strike of the anthracite miners in Eastern Pennsylvania will have no effect on this district other than to draw a certain supply of coke from this region as the furnaces deprived of

their regular supply of coal will no doubt change over to coke owing to the pressing demands for their output. At Tonawanda, N. Y., the two furnaces of the Tonawanda Iron & Steel Co. are out of blast owing to a strike of the ore handlers, and from present indications these furnaces will be out some time.

The activity in the furnace building line continues and W. A. Rogers and associates have decided to erect two additional furnaces at Buffalo, N. Y., with a daily capacity of about 350 tons each. The company to operate these furnaces will be incorporated shortly with a capital of $3,000,000.

PIG IRON.—Further advances have been made in Bessemer iron during the week, and since the brokers have practical control of all the available iron there is little doubt that prices will go still higher. The highest price recorded this week was $22 Pittsburg for a lot of 1,000 tons, and an advance of 25 cents is already being asked by some of the brokers. The demand for foundry irons is not very heavy, but sales in small lots have been made at $21 to $21.50 Pittsburg, while a sale of 1,000 tons of forge iron was made at $20 for delivery during July, August and September. Basic iron is quoted at almost the same price as Bessemer, but the quotations are merely nominal, being the asking prices of the few furnaces and brokers with odd lots still unsold. We revise quotations as follows:

Bessemer, Valley	$21 00 to	21 50
Bessemer, Pittsburg	21 75 to	22 00
No. 1 Foundry	21 00 to	22 00
No. 2 Foundry	20 75 to	21 50
No. 3 Foundry	19 50 to	20 50
Gray Forge, Pittsburg	19 00 to	2 00
Chilled Basic, Valley	20 50 to	21 00
Chilled Basic, Pittsburg	21 25 to	21 75

STEEL.—The domestic steel market is following Bessemer iron, and small sales for prompt delivery of Bessemer billets have been made at $34 per ton during the week. With the domestic market ruling so strong there is little doubt that the imports of German steel will grow heavier and there are many inquiries going the rounds for both sheet bars and billets for second half delivery. German billets are quoted at $32.50 and sheet bars at $33 Pittsburg. A meeting of the independent sheet manufacturers will be held shortly for the purpose of hearing the report of Commissioner W. F. Bonnell. While he has offers on German steel it is extremely doubtful if any will be taken owing to the recent purchases of foreign steel by nearly all the independent sheet manufacturers.

FERRO-MANGANESE.—Domestic ferro is very scarce and considerable foreign material is being sold at prices ranging from $48 to $50 per ton. Domestic manganese is quoted at $52.50 per ton, delivered at buyer's mill.

SPELTER.—The spelter market continues unchanged and we quote prime western grades at 4.25c to 4.27½c Pittsburg.

MUCK BAR.—Owing to the advancing market on forge iron muck bar has increased in price steadily during the past week and small sales for prompt delivery have been made at $36. For extended delivery $34 to $34.50 is asked.

SKELP.—There is very little skelp moving, although extremely high prices prevail. Iron skelp is scarce and high in price owing to the recent advances in muck iron. We quote both grooved and sheared iron skelp at 2.20c to 2.25c and steel at 2.15c to 2.20c.

RAILS AND TRACK MATERIAL.—There has been little movement in new standard sections owing to the inability of the mills to make prompt deliveries on even small lots. Some business has been taken, however, for November and December, the starting up of the Ohio plant at Youngstown on rails helping out the situation. Light rails are in big demand and are commanding high prices. We revise quotations as follows: Standard sections, 50 pounds and over, in lots of 200 tons and over, $28; car lots and less than 200 tons, $30; less than car lots, $32; light rails, 8 pounds, $45; 12 pounds, $42; 16 pounds, $39; 20 pounds, $37; 25 to 40 pounds, $34 to $36. Track material: Spikes, 2c to 2.05c; track bolts, square heads, 2.50c; hexagon heads, 2.65c; fish plates, 1.60c.

PLATES.—Demand for all kinds of plates is heavy and all the mills are now carrying immense tonnages for future shipment on their books. Quotations remain unchanged as follows: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plates more than 100 inches wide, 5c extra 100 pounds. Plates 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5 cents extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

BARS.—Considerable new business continues to be placed in steel bars, while there is some activity in iron bars for delivery the second half of the year. Quotations remain unchanged as follows: Bessemer steel bars, 1.60c; open-hearth, 1.70c; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer under three inches, 1.70c; over three inches, 1.80c; bar iron, 1.70c to 1.80c, Pittsburg, with full freight added to point of delivery. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots; refined iron bars, 2c and upwards.

PIPES AND TUBES.—Demand continues strong and a large volume of business continues to be placed. Quotations, however, remain unchanged.

We make the following discounts to jobbers in carload lots, Pittsburg:

MERCHANT PIPE.

	Black Per cent.	Galv. Per cent
⅛ to ⅜ and 11 to 12 inches	60	48
½ to 12 inches	67	55

Discounts below are to consumers, carload lots, Pittsburg:

BOILER TUBES.

Steel.

	Per cent.
1 to 1½ inches	45
2¼ to 5 inches	63½
1¾ to 2¼ and 6 to 13 inches	58

Iron.

	Per cent.
1 to 1½ and 2¼ inches	39
1¾ to 2⅛ inches	38
2¼ to 13 inches	48

CASING.

	S. and S. Per cent.
2 to 3 inches	58
3¼ to 4 inches	63
4¼ to 12½ inches	65

SHEETS.—The American Sheet Steel Co. is now adding 14 new sheet mills, a number of which at Vandergrift, Pa., will shortly be placed in operation. The completion of these mills will greatly increase the output of the company's product especially of the heavier gauges. The market continues strong. Our quotations are as follows: Nos. 10 and 12, 2.40c to 2.50c; 14 and 15, 2.50c to 2.60c; 16, 2.60c; 18 and 20, 2.70c to 2.80c; 22 and 24, 2.80c to 2.90c; 26, 2.90c to 3c; 27, 3c to 3.10c; 28, 3.10c to 3.20c; 29, 3.25c to 3.35c; 30, 3.35c to 3.45c. Galvanized sheets, in carload lots to consumers, are quoted at 3.05c for Nos. 10 and 11, 3.45c for Nos. 18 to 21, 4.20c for No. 27, and 4.50c for No. 28. Galvanized sheets, mill shipments in carload lots, are as follows: No. 14, 3.05c; No. 16, 3.15c; No. 20, 3.35c; Nos. 22 and 24, 3.65c; No. 26, 3.95c; No. 27, 4.20c; No. 28, 4.45c. Quotations on mill shipments in less than carload lots are as follows: No. 14, 3.25c; No. 16, 3.35c; No. 20, 3.55c; Nos. 22 and 24, 3.85c; No. 26, 4.15c; No. 27, 4.40c; No. 28, 4.65c. For shipment from warehouse jobbers ask 5 cents per hundred above the latter quotations which may be considered the quotations to the average consumer.

STRUCTURAL MATERIAL.—Local structural fitting concerns and contractors have not yet purchased foreign material although considerable is being offered. Business for delivery next year continues to be contracted for by the largest producer at present quotations which are as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles from 3 to 6 inches, 1.60c; universal mill plates, 1.60c.

WIRE AND WIRE NAILS.—Jobbers report an excellent demand for wire and wire nails while the cut nail manufacturers report that the amount of business that is being placed is extremely satisfactory. Quotations remain unchanged as follows: Wire nails in carload lots, $2.05 per keg; smaller lots, $2.10 and $2.15; plain wire, $2 in carload lots and $2.10 in less than carload lots to retailers; galvanized wire $2.40 in carload lots, polished staples, $2.20, and galvanized staples, $2.60; painted barb wire, $2.60, and galvanized, $2.90. These prices are quoted on a Pittsburg base, plus the actual freight to destination. Cut nails are held at $2.05 in carload lots and $2.10 in less than carload lots, Pittsburg, plus freight to destination.

MERCHANT STEEL.—Demand for shafting is reported very

large and nearly all the shafting manufacturers have orders on their books for fully three months' business. Quotations are unchanged as follows: Turned, cold rolled ground shafting in carload lots is quoted 50 off, and in less than carload lots, 45 off; tire steel, 1.80c in carload lots and 2c less than carload lots; toe calk, 2.10c to 2.25c; sleigh shoe, 2.10c to 2.25c; machinery steel, 1.70; smooth machinery steel, 1.75c. Tool steel, 7 cents and upwards.

OLD MATERIAL.—Prices of all kinds of old material continue high and the heavy buyers are not buying to cover future requirements. Thus far, however, there has not been a sign of weakness in any of the lines as the dealers report that desirable material is very scarce. We revise quotations, gross tons, as follows: Heavy wrought scrap, $19.50 to $20.50; cast scrap, $17.50 to $17.75; iron rails, $24 to $25; car wheels, $19; cast borings, $11.50 to $12; wrought turnings, $13.50 to $14; steel rails, short lengths, $22 to $23; steel rails for rerolling purposes, $25 to $26.

COKE.—The output of the Connellsville region continues to be about 220,000 tons weekly, although there is a market for fully 30,000 tons more provided the cars could be secured to move the product. Connellsville furnace coke for prompt shipment is held at $2.50 per ton and foundry at $3. Outside cokes are held at about 25 cents per ton less.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, May 13.

The general outlook is a little more favorable than it has been for some time, and buying has been quite active in the past week. Several Southern furnaces have re-entered the market and are now accepting orders for delivery in the last half on the basis of $16 Birmingham for No. 2 foundry, which is $19.65 delivered in Chicago. Some are asking 25 cents more than this price, though the $16 quotation generally prevails. The scarcity of finished material of all kinds and the high prices demanded by jobbers for their stocks are compelling consumers to look more and more to foreign mills for their supplies. There have been large offerings of foreign iron and steel in this city in the past week, and sales of 20,000 tons of billets and 3,000 tons of beams are noted. Representatives of foreign manufacturers say that their inquiry aggregates many thousand tons, and that on orders for structural steel, of not less than 150 tons, their mills are guaranteeing to roll standard American shapes and sizes. Chicago parties have placed orders in Belgium in the past week for 10,000 tons of 60-pound rails, shipment from Antwerp to be made in June, July and August. Another order for 800 tons of 60-pound rails was also placed with Belgium mills by a local concern for delivery in California, the price being $42, delivered on the Pacific coast. As an indication of the active demand for rails and their scarcity in this country, we note the sale of 1,000 tons of Canadian relaying rails for delivery in Mexico, the same being shipped across the United States in bond. Local offices of Eastern structural mills are now accepting orders at present quotations, for delivery next year, and several sales of moderate tonnage have been made. There is a heavy demand for plates and a corresponding scarcity of material. Jobbers have advanced prices $2 a ton.

PIG IRON.—The local market is quite active, and the sales and inquiries for the last half and last quarter of the year are of greater magnitude than for several weeks. Orders for 1,000 tons are becoming more common, while 500 tons is the average. Several Southern furnaces have announced in the past week that they will accept business for delivery in the last half and there has been a scramble by many foundries that were short to get the earliest dates obtainable. Southern iron is being offered for this delivery on the basis of $16 Birmingham for No. 2 foundry, which is $19.65 delivered in Chicago. No. 1 is sold at $17, and No. 3 at $15.50. There is an insistent demand for spot iron, but very little is being offered. A sale of No. 1 soft was made a short time ago for quick shipment at $20 Birmingham. Some Southern furnaces are having trouble with their labor and shipments into this territory are not quite as steady as both operators and foundrymen could wish. We have revised our quotations as follows:

Lake Sup. Charcoal	$22 50 to $23 00	Southern Coke No. 4	$18 65 to $19 15
Local Coke Fdy. No. 1	21 00 to 21 50	Southern No. 1 Soft	20 65 to 21 65
Local Coke Fdy. No. 2	20 00 to 20 50	Southern No. 2 Soft	19 65 to 20 65
Local Coke Fdy. No. 3	19 50 to 20 00	Southern Gray Forge	16 90 to 17 90
Local Scotch Fdy. No. 1	21 00 to 21 50	Southern Silveries	18 25 to 19 65
Local Scotch Fdy. No. 2	20 50 to 21 00	Jackson Co. Silveries	23 10 to 23 80
Southern Coke No. 1	20 65 to 21 65	Ohio Strong Softeners	23 10 to 23 60
Southern Coke No. 2	9 65 to 20 65	Alabama Car Wheel	23 65 to 24 15
Southern Coke No. 3	19 15 to 20 15	Malleable Bessemer	20 30 to 20 50

BARS.—All the local mills report business of good proportions, and that orders for 1,000 tons are not uncommon. Fairly good deliveries can be made on iron bars, though on steel most of the mills are sold up for nine months and more. We quote Chicago delivery steel, 1.75c to 1.85c; angles, 1.85c; iron, 1.85c to 1.95c; hoops, 2.15c. Prices out of store, steel, 2c to 2.10c; iron, 2.25c; hoops, 2.30c to 2.40c.

SHEETS.—Current demand shows no diminution. Mills report that they are well sold up on gauges 10 to 18, and cannot give early delivery on these. On lighter gauges, the buying is not so heavy and fairly prompt shipment can be guaranteed. We quote No. 27 black, mill shipments, Chicago delivery, 3.15c to 3.25c; galvanized, 4.40c to 4.50c; out of store, No. 27 black, 3.45c to 3.55c; galvanized, 4.70c to 4.80c.

STRUCTURAL STEEL.—Sales of 3,000 tons of foreign beams were made in this city last week, and representatives of foreign manufacturers report that their mills are guaranteeing to roll standard American shapes and sizes on orders for not less than 150 tons. Local offices of Eastern structural mills are not taking much business for delivery next year, though orders aggregating 5,000 tons are reported to have been accepted. The following quotations have not been changed by mills, though buyers have to pay from $2 to $4 a ton higher for material for shipment this year. Beams, 15 inches and under, 1.75c; 18 inches and over, 1.85c; structural angles, 3x3 to 6x6, 1.75c; over 6x6, 1.85c; angles, channels and tees smaller than three inches, 1.85c base; plates, 1.95c. Prices on lots from store are based on the necessities of the buyers, and vary in the different offices. They range from 2½ to 3½ cents a pound.

BILLETS.—Sales of 20,000 tons of foreign billets were made in the last week, for deliveries extending through the balance of this year. The first shipment of 1,000 tons on an order for 10,000 tons placed abroad by a local concern some months ago, was received last week. We quote domestic billets, as follows: Bessemer, $38; open-hearth, $40.

RAILS AND TRACK SUPPLIES.—Orders have been placed in Belgium in the past week by local parties for 10,000 tons of 60-pound rails, shipment from Antwerp to be made in June, July and August. Another local concern placed an order in Belgium last week for 800 tons of 60-pound rails, the price being $42 delivered in California. The inability of consumers to get new rails has developed an active demand for relayers, and we note the sale of 1,000 tons of Canadian relayers for delivery in Mexico, by Chicago parties, these rails being shipped across the United States in bond. There has been some good-sized inquiries for 80-pound rails for 1903 delivery. We quote standard sections, $28; light rails, 45 pounds, $33; 12 pounds, $40, with regular differentials for intermediate sizes; out of store, $45 to $50; splice bars, 2c; spikes, carload lots, 2.35c to 2.50c; track bolts and hexagon nuts, 3.10c to 3.25c; out of store, 3.50c; square nuts, 2.95c base; out of store, 3.10c.

MERCHANT STEEL.—Quite a large number of small orders have been received in the past week, aggregating a good tonnage. Mills report they are sold farther ahead this year than they have been for many years at this period. Prices are held firmly. We quote mill shipments, Chicago delivery, as follows: Smooth finished tire steel, 1.95c to 2c; open-hearth spring steel, 2.45c to 2.60c; sleigh shoe, 1.75c to 1.80c; flat sizes, concave and convex, 2c; out of store, 2.15c; cutter shoe, 2.40c to 2.60c; machinery steel, 2.15c to 2.25c, base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.25c to 2.35c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; specials, 13c and upwards; less than carload lots, 5 percent to 10 percent higher; cold rolled shafting, carload lots, 50 percent off, Chicago; less than carload lots, 45 percent off, Chicago.

MERCHANT PIPE.—The market is devoid of any exceptional features. The demand keeps up to past proportions and mills are making fairly prompt shipments. We quote as follows:

MERCHANT PIPE, RANDOM LENGTHS.

	Black Per cent.	Galv. Per cent.
⅛ to ⅜ in.	56½	44½
½ to 12 in.	63½	51½

BOILER TUBES.

Steel.

	Per cent.
1" to 1¾ in.	35
1¾ to 2¾ in.	50
2¾ to 5 in.	57½
6 to 13 in.	52½

Iron.

	Per cent
1¾ in.	35
1¾ to 2¾ in.	32½
2¾ in.	35
2¾ to 5 in.	42½

CAST IRON PIPE.—Several big orders were closed last week and the local concern reports buying active in all parts of the country. We quote as follows: 4-inch water pipe, $31, carload lots, f. o. b. Chicago; 6-inch water pipe and larger sizes, $29 to $30; gas pipe, $1 a ton higher than above prices.

PLATES.—Jobbers have again advanced prices $2 a ton. The local mill is sold several months ahead and has announced it will not accept any more orders until after July 1. We quote as follows, Chicago delivery: Tank steel, base, ¼-inch, 1.90c to 1.95c; flange steel, 2c to 2.10c; out of store, tank steel, ¼-inch, 2.10c, 3-16, 2.20c, No. 8, 2.30c; flange steel, 2.25c.

WIRE AND WIRE NAILS.—The local interest reports that there is no diminution in the volume of current business. We quote as follows: Smooth wire, carload lots, $2.15; painted barb wire, $2.75; galvanized barb wire in carload lots, $3.05, wire nails, carload lots, $2.20; staples, carload lots, $2.30; jobbers' prices to retailers, 10 cents higher than above for carload lots, and 20 cents higher for less than carload lots.

COKE.—The demand for coke has fallen off slightly. Shipments from Eastern and Southern coke points are full. We quote standard 72-hour Connellsville foundry, $5.25; for spot shipment, $5.50; Virginia and West Virginia coke, $5 to $5.25.

OLD MATERIAL.—Railroads have been the most active sellers in the past week, and full prices have been secured. The market is firm, and though the buying is not up to past proportions, sellers are holding prices up. We quote gross tons, as follows:

Old iron rails	$24 00 to $25 00	Old steel rails, mixed	$16 00 to $16 50
Old steel rails, 5 ft. and up	22 00 to 23 00	Relaying rails	27 00 to 28 00
Old steel rails, 3 ft. and under	17 00 to 18 00	Old wheels	19 00 to 19 50
		Heavy melting steel	15 50 to 16 00
		Mixed country steel	13 0 to 14 00

The following are selling prices per net ton:

No. 1 R. R. wrought	$19 50 to $20 00	Steel axles	$19 00 to $19 50
No. 2 R. R. wrought	18 00 to 18 50	Cast borings	8 50 to 9 00
Dealers' forge	15 50 to 16 00	Wrought turnings	12 50 to 13 00
No. 1 busheling	13 50 to 14 00	Iron axle turnings	14 00 to 14 50
No. 1 R. R. & mch. cast	13 50 to 14 00	Steel axle turnings	13 00 to 13 50
Railway Malleable	15 00 to 15 50	Stove plates	10 50 to 11 00
Country malleable	13 00 to 14 00	Old iron splice bars	21 00 to 21 50
Iron axles	24 50 to 25 00		

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, May 14.

PIG IRON.—In foundry iron there is continued buying, though no large transactions are reported locally. The price is determined in each case by the delivery called for and by the urgency of the buyer's needs. No. 2 iron for delivery in the next two or three months has sold at $21 at Ohio furnace, and as much has been paid for No. 3 where the buyer had shopped around before finding the furnace with enough iron on hand to take care of him. Prices for the third and last quarter are substantially on a $20-$21 basis for No. 2 and there is little evidence of the effort made one or two months ago by certain interests to inject an element of moderation into the market by the quotation of low prices. Charcoal iron is very scarce. The Lake Superior furnaces are sold up for the year, as are the Southern furnaces. Southern Ohio furnaces have made sales as high as $30 at furnace for warm blast iron. In forge iron very little is doing, the mills being supplied for the most part for the next three or four months. Sales have been made as high as $18.75 and $19 at furnace. There is practically no Bessemer iron on the market. A sale through a broker is reported at $21.25 at furnace, or $22 at Pittsburg. We quote as follows:

Bessemer	$20 25 to $21 25	Scotch No. 1	$20 75 to $21 75
No. 1 Strong F'dry	20 75 to 21 75	Scotch No. 2	20 00 to 21 00
No. 2 Strong F'dry	20 00 to 21 00	Gray forge, Valley	18 50 to 18 75
No. 3 Foundry	18 75 to 19 75	LakeSuperior charc'l	22 00 to 23 00

FINISHED MATERIAL.—Some activity is reported in structural shapes for delivery after Jan. 1, some 4,000 tons of such material being contracted for locally. With these shapes is a certain tonnage of plates; but as a rule the mills are not offering plates. It is not believed the price will be advanced at this week's meeting of the manufacturers, but the price is advancing, the material available being largely in the hands of jobbers. The latter are quoting 1.70c Pittsburg for tank, or $2 above the pool basis. The amount of business in all finished lines handled through jobbers is growing, in view of the conditions that have existed in the trade this year—the large advance commitments of the mills and the steady prices that have been maintained by manufacturers. There are indications of a widening rather than a narrowing scope for the jobber, and this development is apparently with the full approval and co-operation of the manufacturer. No change is to be noted in the situation in bars and sheets in the past week. Bars are in steady demand from consumers who do not at any time place large orders, but keep rather close to the market. We quote 1.68½c Cleveland for Bessemer steel bars and 1.78½c for open-hearth. Bar iron is still 1.88½c Cleveland for mill shipments, while from store prices on iron and steel range from 1.90c to 2c Cleveland. The sheet market holds a steady tone. While demand is up to that of last year at this time in the experience of local handlers, it does not show the increase apparent in some other lines. While there are more producers offering sheets the tonnage of new plant is relatively speaking not large; nevertheless there is not the pressure from consumers that is apparent in other lines. We continue our previous quotations as follows: On mill sales of black sheets—No. 24, 2.90c to 3c; No. 26, 3c to 3.10; No. 27, 3.10c to 3.20c; and the following prices out of stock: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.55c to 2.70c; No. 16, 2.95c to 3.10c; No 18, 3c to 3.15c; No. 20, 3.05c to 3.20c; Nos. 22-24, 3.15c to 3.30c; Nos. 22-26, 3.25c to 3.40c; No. 27, 3.35c to 3.50c; No. 28, 3.45c to 3.60c, for one pass cold rolled. For full cold rolled .10c extra is charged. On galvanized sheets Cleveland prices to consumers are as follows for carload lots: Nos. 10 and 11, 3.15c; Nos. 12 to 14,, 3.25c; Nos. 18 to 21, 3.55c; Nos. 22 to 24, 3.85c; No. 27, 4.35c; No. 28, 4.60c.

OLD MATERIAL.—The reported declines in Eastern and Western scrap markets has made no change in this vicinity and prices remain the same. There is a tendency to shade the figures on cast borings, while on the other hand heavy steel scrap and machinery cast are somewhat firmer, but dealers quotations for Cleveland delivery are substantially as follows, all in gross tons:

Old iron rails	$ 24 00 to 26 00
Old steel rails (6 ft. and over)	21 00 to 23 00
Old steel rails (6 ft. and under)	17 00 to 19 00
Old car wheels	18 00 to 19 00
No. 1 R. R. wrought scrap	21 00 to 22 00
Mill scrap	17 00 to 18 50
No. 1 machine cast scrap	15 00 to 16 00
Iron axles	26 00 to 28 00
Axle turnings	16 00 to 17 00
Wrought turnings (free from cast)	13 50 to 14 00
Cast borings	9 00 to 10 00
Uncut wrought iron boilers	11 00 to 12 00
Steel boiler plates	16 00 to 17 00
Grate bars	11 00 to 12 00
Pipes and flues (clean)	17 00 to 18 00
Tank iron	17 00 to 18 00
Hoop and band iron	13 00 to 14 00
Sheet iron	11 00 to 12 00
Wrought drillings	13 00 to 13 50
Malleable iron	17 00 to 18 00
Stove plate	12 50 to 13 50
Heavy steel	17 50 to 18 50

CINCINNATI.

May 14.

It was predicted in the last letter from Cincinnati that before the next one was written the large Southern iron producers that had gone out of the market by agreement would, in part at least, re-enter the market. This has been realized, and for one the Sloss-Sheffield Steel & Iron Co. has come into the market with iron for delivery from the end of the first half of the year on and the basis on which it is offered is $16, Birmingham, for No. 2. Strictly speaking the company has asked for offers on this basis and offers have been made which it is understood will be accepted. Farther than this there are some producers who have had, so they say, con-

firmation of orders at this price. The Tennessee Coal, Iron & Railroad Co. is still out of the market, having sold its output for the remainder of the year. The company will be in the market on and after Sept. 1 for iron deliverable in 1903. The situation in the South is just this—that the agreement to remain out of the market and hold the market at $12 for No. 2 has been declared off by limitation and all producers are at liberty to sell iron at any price they can or will.

This action on the part of the large Southern pig iron producers will relieve the situation somewhat, though there is likely to be considerable disappointment among such consumers as have refrained from buying iron at the prevailing prices because they had reason to believe that they could get iron on the basis of $12 later on. It seems to be a case where the large producers meant well and would have done well by the market had it not got clear away from them.

The general situation in the iron trade is good. Consumers of pig iron are having a large demand for their products; customers of the foundries are hurrying them up on castings and are reporting a good demand for their goods; handlers of all kinds of finished material are troubled with nothing but a hard time in delivering goods.

Pig Iron.—The fact that some of the large Southern producers have decided to enter the market again will have some influence on the market itself just as the anticipation that they would do so has affected it. Buyers have seen recently that the probabilities were that even if the producers that were out of the market should come in again they would sell at higher figures than $12, they began placing their orders. Of course all this business has been the general run of orders for lots of iron ranging from a carload to 500 tons, but there has been no inconsiderable buying, taking it all together. Demand has been scattered through all grades, but it has been mostly for foundry grades. There have been some inquiries for gray forge and some car wheel iron has been wanted. Sales have been made all the way from $15 to $16 for No. 2, but as far as can be learned the latter figure has prevailed. Prices at Cincinnati may be quoted as follows:

Southern Fdy. No. 1	$18 75 to 19 75	Gray Forge	$16 75 to 17 75
" " 2	17 75 to 18 75	Northern Fdy. No. 1	22 00 to 23 00
" " 3	17 25 to 18 25	" " 2	21 00 to 22 00
" " 4	16 75 to 17 75	Southern C. W. Iron	22 00 to 22 75
So. Fdy. No. 1 soft	18 75 to 18 75	Malleable coke iron	21 50 to 22 50
So. Fdy. No. 2 soft	17 75 to 18 75		

Finished Material.—The demand for all kinds of finished material has been very good and there has been a good deal of trouble with deliveries. Consumers have insisted on as early deliveries as possible and the fact that they are so insistent indicates that they have a need of the iron for which they have contracted. Structural material has been especially hard to get promptly and building operations have been retarded in consequence. Bar iron remains at 1.92c and bar steel at 1.72c, both iron and steel bars being quoted at 2.20c out of store. Angles are 2.35c and 2.50c out of store. Sheets are quoted at 2.50c for No. 12 and 2.35c for No. 10.

Old Material.—The scrap market has been rather quiet, though there has been a good movement of all kinds of old material that the dealers could offer. Prices remain about the same and can be quoted at Cincinnati as follows:

Old No 1. Wrought Railroad, net tons	$ 19 50 to 20 00
Cast Machine and Foundry, net tons	14 00 to 14 25
Old Iron Rails, gross tons	25 00
Old Steel Rails, gross tons	24 50 to 24 75
Old Short Lengths, gross tons	17 50 to 18 00
Old Iron Axles, gross tons	25 00
Old Iron Car Wheels, gross tons	19 00 to 19 50
Stove Plates, gross tons	11 00 to 11 25
Wrought Turnings, net tons	14 00
Cast Borings, net tons	8 50 to 8 75

PHILADELPHIA.

May 13.

The uneasiness prevailing among labor in many directions is making the situation more complicated, and no one can tell with any degree of certainty what will be the course of the iron and steel markets in the near future. The difficulties producers have had to contend with since the beginning of the year have all tended to leave the iron market in a somewhat unsettled condition and if a general strike is prolonged in the anthracite region the effect on other industries must be unfavorable. Shops continue to close for a few days at a time because material is not received in sufficient volume, and wage disputes are also responsible for temporary shutdowns, which are as yet of no great importance, being more of a local character. However, all of these things have the effect of pushing prices to a higher level, and in doing so may hasten the day of reaction. Imports of iron and steel products are increasing, although as yet everything that is landed is eagerly bought up, affording a slight relief in some directions.

Pig Iron.—The scarcity of iron is as marked as it has been at any time and there is little prospect that furnaces even under the most favorable conditions will be able to pile up stocks to any extent. As the year advances the number of concerns that are uncertain of sufficient supplies to keep their works in operation increases, although the majority of these have contracts placed which the furnaces are unable to fill. Both sides, however, are showing a disposition to accommodate themselves to the abnormal conditions now prevailing. The range of prices for Philadelphia and nearby deliveries is about as follows: No. 1 X foundry, $20.50 to $21.50; No. 2 X foundry, $19.75 to $20.50; No. 2 plain, $19.25 to $19.75; standard gray forge, $18.50 to $18.75; ordinary gray forge, $18 to $18.25; Basic (chilled), $19 to $19.50. An advance of from 50c to $1 a ton must be paid above these prices on such lots of iron as are available for immediate shipment.

Finished Material.—A great deal of new building is being planned so that it would seem as if the present scarcity of structural material would continue indefinitely. Some foreign shapes are to be had out of store, but most of these do not meet specifications and local mills can furnish nothing except after long delays. Some of the bar mills in this district are confronted by labor troubles and the shutdown of several departments will cause considerable shortage in this line. The plate mills have all the work they can take care of for a long time to come and new orders are hard to place. Premiums are readily paid when delivery can be made within a stated period. Nominal quotations are as follows: Plates, ¼-inch and thicker, 1.95c to 2c; bars, steel, 1.80c to 1.85c; iron, 1.95c; angles, $1.75c to 1.85c; beams and channels, 1.75c to 1.85c.

Old Material.—With a slightly larger supply consumers are showing a disposition to postpone the placing of orders unless inducements are offered. Bids and offers are about as follows for deliveries buyers' yards: Choice railroad scrap, $24 to $25; ordinary light scrap, $16 to $17; machinery cast, $18 to $18.50; heavy steel scrap, $21 to $22; old iron rails, $25 to $26; wrought turnings, $16 to $17; cast borings, $9.75 to $10.25; old iron axles, $26.50 to $28; old steel axles, $25 to $26; old car wheels, $19.50 to $20.50.

New England Foundrymen's Association.

The May meeting of the New England Foundrymen's Association was held on Wednesday, May 14, at the Hotel Essex, Boston. The members of the Association took supper together at 6 p. m. Following this Archer Brown, of Rogers, Brown & Co., addressed the meeting. The following subjects were then opened for discussion: "Are the piecework or premium systems a profitable method of doing machinery or jobbing work?" Henry A. Carpenter, A. Carpenter & Sons Foundry Co. "The best methods of payment." John Magee, Magee Furnace Co. A meeting was held Wednesday afternoon of the executive committee of the New England founders' entertainment association, and arrangements for the American Foundrymen's Association convention in June were completed. Dr. Richard Moldenke, secretary of the A. F. A., was present at this meeting. The outlook for a well attended convention was reported to be excellent.

Julian Kennedy is consulting engineer for the erection of the Deering steel plant at South Chicago. Mackintosh, Hemphill & Co., of Pittsburg, have the contract for the blooming mill.

A wire rod and wire mill to cost $1,000,000, will be built in East St. Louis, Ill., by the John A. Roeblings' Sons Co., Trenton, N. J. The site is said to be under option but the location will not be disclosed until plans are completed.

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BLAST FURNACE BUILDING IN LAKE CITIES.

Much has been said in the last half dozen years about the advantages of Lake Erie ports for the economical assembling of materials for iron-making. In this connection it is a significant fact that in every lake city of above 100,000 inhabitants save one, work is soon to begin on one or two blast furnaces. Announcement has been made in recent weeks of new furnaces that are to be erected in Chicago, Cleveland, Detroit and Toledo, and elsewhere in this issue the organization is noted of a Buffalo company that will build two furnaces and own iron ore and coal properties. Milwaukee has no new furnace project on hand, but in the past year the Duluth Furnace has been removed to that city and has become part of the reconstructed Minerva Furnace, so that Milwaukee rightly has a part in the furnace-building movement at lake cities that will be a noteworthy feature of the new construction in the iron trade in 1902 and 1903.

All the six or eight furnaces included in the above program will produce foundry iron. With the exception of the two at Buffalo, that no doubt will send considerable iron into the extreme East by way of the Erie Canal, each expects to find its market for the most part within a radius of 100 miles; very much of it, indeed, within the limits of its own city. This indicates, in turn, that the foundry industry is well developed in all these important lake cities. And as thriving foundries are a barometer of industrial activity, pointing to a large consumption of machinery, the conclusion is reached, again, that the lake cities and the districts tributary to them have shown marked industrial development in recent years. There is no parallel in the history of the Lake Region to this furnace-building campaign that is now being entered upon. That a half-dozen companies, representing in the aggregate an ultimate investment of fully $10,000,000 in furnaces and related properties, and officered by men who have made records in iron manufacture, should engage in these undertakings at this time is highly significant. Apart from the faith it indicates, in the postponement for some years of any serious reaction from the present satisfying status in iron and steel, this large addition to pig iron production at lake ports represents strong confidence in the future of the Lake Region, and in its steady growth independent of the ebb and flow of National prosperity.

The census of 1890 made the surprising revelation that in the ten years preceding that year the thirty-two cities on the Great Lakes having a population of 8,000 or over increased in their aggregate population from 1,473,539 to 2,729,108. That is, the thirty-two cities in question showed a growth of nearly 85 percent in the decade between 1880 and 1890. On this showing and other related statistics Superintendent of Census Robert P. Porter made a strong putting of the commercial importance of the lake shore cities and prophesied a growing prominence as centers of industrial population.

We have not before us the population of these same thirty-two cities in 1900, but a comparison between 1890 and 1900 for the six foundry centers to which we have referred gives in part the reason for the new blast furnace enterprises. The statement of population is as below:

	1900	1890	1880
Chicago	1,698,575	1,099,850	503,185
Cleveland	381,768	261,353	160,146
Buffalo	352,387	255,664	155,134
Detroit	285,704	205,876	116,340
Milwaukee	285,315	204,468	115,587
Toledo	131,822	81,434	50,137
Total	3,135,571	2,108,645	1,100,529

The increase between 1890 and 1900 was substantially the same as between 1880 and 1890—in the former period, 1,027,926, and in the latter, 1,008,116. In other words these six cities have nearly trebled their population in 20 years. The percentage of increase between 1890 and 1900 was 48.7. This is as against 32.7 percent gain in the same period for the 161 cities in the United States having a population of over 25,000 in 1900. Thus the percentage of gain for the six cities was 50 percent greater than the average city gain.

Probably no more impressive nor more substantial industrial development can be found anywhere in the country than is so distinctly pointed out by census statistics, by the known additions to manufacturing plants, and by the plans for new pig iron supply, in these six foremost cities of the lakes.

The New York *Journal of Commerce* comments on the statement of Mr. W. F. Bonnell, in an interview in these columns last week, on the organization of Continental iron and steel works—the director-general at the head assuming responsibility for everything, with no strong capable lieutenants in training to succeed him. It says: "This is diametrically opposed to the plain generally practiced in the United States, but carried to its highest development by Mr. Carnegie and his twenty or thirty partners, upon each of whom he devolved large freedom of action and corresponding responsibilities; while his function, as he rather too modestly described it, was finding these capable men and pushing them ahead as fast as they demonstrated their

fitness, the men who had not demonstrated fitness being relegated to the rear. Thus in the American concern there is the widest possible opening for new ideas, new methods and new men. It is made the motive of every man to promote progress, improvement, better results. The Continental method is admirably arranged to perpetuate the existing order. No subordinate has power, and therefore he has no motive for assuming responsibility or devising change. The director-general comes into his position with inadequate training of the broader sort and finds safety in perpetuating what he finds established, and is too busy with details to do the thinking which here is regarded as the most important and almost the entire duty of the man at the head of the concern." These who affect to think that all is water in the capitalization of a great industrial corporation, beyond the amount for which the plants could be replaced, may well ponder on the contrast between American and Continental steel works organization. The generalship, methods and personnel of some domestic steel companies that could be named rank very close as assets to the value of the plants that are their tools of production.

A steel casting concern which advertises its stock rather than its product, says in one of its recent announcements in household journals that by its *patent secret* discovery "all the time-wasting, expensive processes of forging, tempering and annealing are avoided. Carefully measured ingredients are introduced into the boiling mass of steel scrap and the finished cast will have all the qualities of the best tool steel or the forged and turned engine crank as you wish. The *secret* lies in the mixture which the modern alchemists, Messrs. ——— and ———, have discovered; and the ——— ——— Company own the patents thereon in this country and in twenty-three foreign countries." Such statements would never be made in announcements likely to be read by men who know that a process cannot be at the same time patented and secret.

The second open-hearth furnace at the plant of the Allegheny Iron & Steel Co., Pittsburg, will be placed in operation within two weeks.

The water softening and purifying business of the We Fu Go Co., of Cincinnati, together with all its patents, capital stock, and good will, has been purchased by the Wm. B. Scaife & Sons Co., of Pittsburg. Wm. B. Scaife & Sons Co. state that their softening and purifying plants in the United States alone are now daily treating over 14,000,000 gallons of water. The plants they have installed are now to be found in iron and steel works, ice plants, bleacheries, malt houses, textile works, hotels, office buildings, laundries, etc., including practically all industrial and domestic purposes.

The directors of the Ohio Solid Steel Co. held a meeting in Cleveland last week and elected officers as follows: Martyn Bonnell, president; Chas. A. Parsons, vice president; C. A. Patterson, treasurer; T. H. Bushnell, secretary. The temporary office of the company has been established at 430 Garfield Building, Cleveland. Negotiations are under way regarding site.

The Miller Improved Gas Engine Co., of Springfield, O., is erecting a new building at Fair and Plum Sts., 72x291 feet, one story high with 8-foot ventilator over the entire building. The new plant will be running by July 1.

THE FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the Foundrymen's Association was held at the Manufacturers' Club in Philadelphia on Wednesday, May 7, the president, Thos. I. Rankin, occupying the chair. There was an attendance of 35 members and visitors. Secretary Howard Evans announced that the steps for the incorporation of the Association had advanced to the point of applying for a charter.

After the adjournment of the meeting the members reassembled in the cafe where the usual luncheon was served and speechmaking was indulged in to a late hour.

The address of the evening was by E. H. Mumford, who spoke of the application of the Tabor vibrator molding machine to large work. Lantern slides were used in illustration. The speaker said that while the Tabor company built probably larger power ramming molding machines for general use and had still larger machines in prospect than were as yet common in the trade, the idea that machine molding was at once to be applied to such castings as loam cylinders with blanket cores, 30-ton bed plates, etc., was more or less visionary.

Molding machines, he said, were variously understood by the trade. Some were called molding machines which only rammed the mold; others which only drew the patterns, and yet many machines did both. Mr. Mumford then showed on the screen a power ramming machine for molds of large size which was simply a big power squeezer. He next showed a large sized hand ramming molding machine with 10-inch pattern draft which only drew the patterns. There was then shown a complete machine for both power ramming and drawing the patterns for molds 30x48 inches, the machine having 12-inch pattern draft. He explained that in this large machine, while the deeper pockets of sand around the pattern had to be more or less tucked by hand, yet the main body of the sand in a flask each half of which is 16 inches deep was rammed by the machine itself, and showed how the entire working of the machine was carried out from one station by the operation of two valves.

The Tabor molding machines as built today do their ramming by a quick blow. The speaker thought this method of ramming had some advantages over the slow pressure inasmuch as it took advantage of the fact that the loose sand contained air which more or less livened up the sand when the blow was put upon it quickly.

The hand ramming machine which was shown was explained to be useful especially for such deep work as couplers, oil boxes for cars, etc., and details of the machine were shown illustrating the application of various forms of stripping plates to such patterns as require stripping.

The 30x48-inch complete machine which was shown on the screen in detail and in general elevation, Mr. Mumford said began work on castings of the nature of covers for journal bearings, having dry and chambered cores and weighing 1,000 pounds each. The output on this machine, he stated, was 12 molds, or 12,000 pounds from a molder and helper. In connection with the work on this machine it was explained that wooden stripping plates were used on some of it, the stripping plates in some cases being clamped to flasks when lifted from the machine and returned to the machine afterward. The stripping plate and the vibrator were often used simultaneously, and sometimes one sometimes the other. The use of the wooden stripping plates clamped to the flasks and lifted from a machine with them, Mr. Clark at Schenectady has found to save the necessity of bars in the flasks on this large work. To make possible the use of such stripping plates no change in the machine is necessary, the stripping plate covering the flask frame and pattern plate together, and on hand ramming machines for such work as oil boxes, sheet brass stripping plates about 3-16-inch thick are successfully employed. The speaker said that he had stripped 5x9-inch oil boxes on one of the Tabor machines with a sheet of ordinary roofing tin made into a stripping plate for the work in an hour.

The discussion which followed the address developed the interest which all foundrymen have in knowing how far machine ramming can go on large work and Mr. Mumford made it very clear that no builder of power ramming machines

would pretend today that close spaces between flasks and patterns or deep pockets in the pattern surface, such, for instance, as the pocket in a grate bar could be rammed by power. This would be possible if sand could be treated as a fluid, but it cannot, as it moves very little out of the direct line of pressure and its friction on itself and its surroundings is very great.

Asked to forecast the future as to the size of work on which molding machines would be used, the speaker stated that his company was at the moment building a power ramming and pattern drawing machine to handle flasks 28x70 inches, the two power ramming elements of which each weighed 20,000 pounds, to produce castings weighing from 900 to 1,200 pounds each, and that he saw no reason why the radically new principle involved in this machine should not be applied to castings molded in flasks and weighing 10,000 pounds.

Electricity in New Rolling Mill Plants.

The Youngstown Iron Sheet & Tube Co., of Youngstown, O., broke ground last week for its skelp mill. The tube mill adjoining will be ready to start up, it is expected, by July 1. A feature of the tube mill is that it will contain no engine, tables, rolls, etc., being all driven by electricity. Twenty-five motors will be scattered through the mill. This will be the only mill in the country entirely driven by electricity.

At the new open-hearth plant of Wickwire Brothers at Cortland, N. Y., electricity will be employed to a larger extent than in any similar plant in the country. There will be an engine for the blooming mill rolls and an engine for the generator, but beyond this electric motors will be used in every instance. The engineering is in the hands of the Wellman-Seaver-Morgan Engineering Co., of Cleveland.

Work is under way on the new open-hearth plant of the Grand Crossing Tack Co., Grand Crossing, Ill., which will consist of three 50-ton furnaces, with a 34-inch blooming mill. The Morgan Construction Co., of Worcester, Mass., is consulting engineer. The Wellman-Seaver-Morgan Engineering Co., has the contract for the open-hearth furnaces and the blooming mill. The engines are to be furnished by English builders.

The American Locomotive Co. has increased the capacity of its plants to 2,150 locomotives and has work ahead running into 1903. It is contemplated to increase the capacity further to about 3,000 locomotives.

The new shops of the Philadelphia Pneumatic Tool Co., at 21st St. and Allegheny Ave., Philadelphia, are nearing completion and the company will remove from its present location to the above address the last week in this month. The power plant is now installed and everything will be in readiness for the full operation of the new plant in the course of two weeks. About $10,000 worth of new machine tools will be delivered early in June, and with these the company will soon be able to relieve its much overcrowded condition and be able to make more prompt delivveries. About 150 men will be required immediately to do the work it is now trying to do in crowded quarters with 95 men. There have recently been placed upon the market two new sizes of rotary drills and an improved riveting hammer has been perfected which is being made in three sizes, having capacities varying from ¼ to 1¼-inch rivets. The company has recently received orders aggregating nearly 200 tools, from one of the largest shipyards in the country, and this together with a lot of railroad and other trade, makes an unprecedented rush of business. Preparations are being made for an elaborate display of the company's penumatic tools in a working exhibit at the convention of Master Mechanics and Master Car Builders, at Saratoga, June 18 to 25.

James Huston Watt, president of the Watt Mining Car Wheel Co., Barnesville, O., died at Philadelphia on May 2.

ORE STOCKS ON LAKE ERIE DOCKS MAY 1.

Official figures bear out the statement recently made in these columns that the stocks of iron ore on Lake Erie docks on May 1 would be not far from the amount reported last year at the same time, or about 3,000,000 tons. The exact figure is 2,848,194 gross tons as against 3,050,183 tons on May 1, 1901. In should be explained that 2,848,194 tons represents the amount of old ore on dock on May 1, deduction being made for the ore brought down and put on dock in April of this year. There was a heavy shipment of ore in April from upper-lake docks, but no large amount was put on docks at Lake Erie ports. Much of it was still in transit on May 1 and the greater part of the ore that reached ports below went direct to furnaces. In order that the statistics might tally with those of last year, when no ore was moved in April, the deduction of new ore was made, as stated. The following table shows the stocks on dock on May 1, 1900, 1901 and 1902 by ports, with the amount on the same docks on Dec. 1, 1899, 1900 and 1901:

Ports.	CLOSE OF NAVIGATION.			OPENING OF NAVIGATION.		
	Dec. 1, 1899.	Dec. 1, 1900.	Dec. 1, 1901.	May 1, 1900	May 1, 1901.	May 1, 1902.
Toledo	186,422	242,375	254,196	52,6 6	138,453	111,511
Sandusky	23,184	95 111	4 ·3?4	4,300	63,148	37 400
Huron	164,480	211,377	231,501	48,412	135,147	129 615
Lorain	337,822	251,838	195,863	126,212	140,561	96,992
Cleveland	1,200,806	1,337,445	1,378,060	386,291	806,119	621,865
Fairport	692,147	611,717	7.0,590	282,298	306,7 6	472,325
Ashtabula	1,902,598	1,8 1,459	1,769,145	678,789	1,046,974	924,742
Conneaut	468,808	630,514	604,166	8,649	69,755	152,891
Erie	361,335	480,734	470,718	97,894	225,412	223,972
Buffalo	192,681	232,100	198,100	35,195	118,007	73 861
Total	5,530,283	5,904,670	5,859,663	1,720,656	3,050,183	2,848,194

The total rail shipments from Lake Erie ports to furnaces in the winter of 1901-1902 appear by comparing dock stocks Dec. 1, 1901, and May 1, 1902:

	Gross tons.
On dock, Lake Erie ports, Dec 1, 1901	5,859,663
On dock May 1, 1902	2,849,194
By rail to furnaces, winter of 1901-2	3,010,469

The shipments to furnaces in the seven months from May 1 to Dec. 1, 1901, together with the consumption by furnaces at Tonawanda, Buffalo, Cleveland and Lorain, receiving ore direct in their own yards, amounted to 14,204,596 tons. Adding to this the shipments of the past winter—3,010,469 tons as above—gives a total for the year ending May 1, 1902, of 17,215,065 tons. This is against 14,468,260 tons in the 12 months ending May 1, 1901, and 15,574,785 tons for the 12 months ending May 1, 1900, these being the greatest previous records.

The important fact in the above statistics is that the iron ore trade, even with this heavy consumption, has not materially reduced the amount of ore carried on dock in the past year. It will be conceded that 3,000,000 tons is far more than need be carried in this way, as a safeguard against strikes or tie-ups on the lakes.

The first rails on the Canadian Government order of 100,000 tons were rolled at the Consolidated Lake Superior Co.'s steel plant at Sault Ste Marie, Ont., last week. A party of capitalists from Montreal and Toronto witnessed the first operations in the rail mill.

W. A. Reade, of Cleveland, and Carl Horix, of Youngstown, have bought the patent wire fencing plant of the Truss & Cable Co., Hornellsville, N. Y. It is stated that the plant will be operated as heretofore for the present.

Northwestern Iron & Machinery Co., Chicago, has been incorporated with a capital of $10,000 to deal in iron and second hand machinery. The incorporators are M. Dry, A. Cohen and M. Stolarsky.

The Superior Gas Engine Co., of Springfield, O., is building a one-story brick building, 65x288 feet, near Sheridan Ave., close to the old East St. shops, and expects to have it running by June 15.

FOUNDERS AND MOLDERS IN CONFERENCE.

Some details of the conference between representatives of the National Founders' Association and of the Iron Molders Union, held in New York, April 21, 22 and 23, are given in the current issue of the *Iron Molders' Journal*. The meetings were in the rooms of the National Civic Federation, Mission Building. The representatives of the N. F. A. were: W. D. Sargent, American Brake Shoe & Foundry Co., New York; A. C. Pessano, Geo. V. Cresson Co., Philadelphia; F. T. Towne, Yale & Towne Mfg. Co., Stamford, Conn.; R. D. Reed, H. B. Smith Co., Westfield, Mass., and John A. Penton, commissioner, of Detroit. Representing the I. M. U. were: Jos. F. Valentine, first vice president; M. J. Keough, second vice president; James S. Flanagan, trustee; W. A. Perrine, business agent of New York and vicinity, and David Black, editor *Iron Molders' Journal*.

Among the questions which President Fox had outlined as subjects of discussion for the union's representatives were, the shorter workday, the machine and its operation, and a clearer definition of the procedure under the New York Agreement. On their part, the representatives of the N. F. A. desired consideration of differentials in the wage rate.

The first subject discussed was the shorter workday. The representatives of the union dwelt strongly upon the economic necessity for a shortening of the hours of labor; they contended that the introduction of labor-saving machinery and improved methods of shop operation should not alone conduce to a cheapening of the price of the product and an increase of the profit of the manufacturer, but also to a shortening of the hours of toil. They urged further that modern methods demanded more arduous and concentrated effort on the part of the workman, and that he was not capable of his best efforts if worked an excessive number of hours each day. For these reasons they felt justified in expecting the co-operation of associated foundrymen in establishing the nine-hour day in the foundry as a step in the right direction and deprecated the fact that some of the members of the N. F. A., apparently backed up by their associations, had thrown obstacles in the way of the shorter workday movement in several localities.

The association's representatives repudiated the idea that they were antagonistic to the nine-hour movement in the foundry; each, in turn, favored the nine-hour day providing it could be made general, but urged strongly against its inauguration during a period of such extraordinary demand as the present. A large number of the foundries were in such a position that a 10 percent decrease in their output would work serious injury.

Reply was made to the effect that all experience of shorter workday movements demonstrated that the output was not lessened in proportion to the shortening of the hours. So convinced were the representatives of the union that this would prove true in the foundry that they felt the nine-hour day should be granted without reduction in pay.

Quite a lengthy discussion took place along the lines indicated. As it was agreed that the conference was to be informal and chiefly for a mutual definition of the position of each side, the conferees of the N. F. A. declined at this time to place themselves on record, but agreed to lay the union's views before their administrative council at its next meeting with a view to further negotiation upon the proposition to make the nine-hour day general in the foundries of their members. Meanwhile, wherever the nine-hour day becomes an issue it will be dealt with, as heretofore, under the New York Agreement.

The discussion upon differentials in wage rates embraced a broad field and was intensely interesting. The representative of the N. F. A., who was their chief spokesman on this subject, advocated the removal of all restrictions upon the number of apprentices, claiming that the molders would not suffer thereby half as much as they imagined. He deplored the policy of unions in restricting output by arbitrary limitations and cited instances in which molders had been fined for increasing the day's work. Such a policy, he said, must inevitably react on the men themselves. It was these things which caused some manufacturers to conceive the idea that trade unions were the barriers of progress and were designed solely to promote the policy of trying to do the least possible amount of work for the greatest attainable wage. The speaker added that in the efforts of the two associations to adjust wage rates the flat minimum had proven, in his opinion, a flat failure, and for that reason they desired consideration of a system of differentials which would permit the foundrymen to pay a lesser rate for work which required little or no skill. The insistence of the union that the minimum rate, no matter how high it went, should be paid to molders on all classes of work, drove manufacturers to introduce molding machines to get relief. The policy of the union towards inferior grade work was driving it to the machine to the ultimate loss of the molder.

The other representatives of the N. F. A. argued along similar lines, the contention being raised that there should be a differential between the wage rates of bench and floor molders and also between the wage rates of molders in large cities and smaller ones. It was said, the molders would in the aggregate be the gainers by such a policy, and the statement was made by way of demonstration that had the molders of Cleveland accepted a scale of $3 per day for floor molders and $2.75 for bench molders, instead of $2.90 straight, they would, as a whole, have earned $16,000 more in a year.

The union's representatives contended that, while restriction of apprentices could not be defended on high moral grounds, it had become necessary in order to place some restraint upon the selfishness and greed of employers, who, with an eye solely to self interest, substituted whenever they could the labor of the woman for that of the man, and the labor of the child of tender years for that of the woman, unless restrained by law, or trade unionism. Trade unionists believed that the best interests of the community would be conserved by sending the child to school, and keeping his father at work.

The policy of restriction of output attributed to trades unions was grossly exaggerated by employers and servile trade papers. Exceptions were dignified as the rule. In the opinion of trade unionists a man should not be compelled to work to the point of exhaustion, and for that reason there was a point where restriction was justifiable to protect the health and comfort of the workman. There was a tendency in America to live too fast, and men became prematurely old and incapacitated. Wherein they strove to remedy this, trades unions were justified.

In the matter of differentiated wage rates our conferees felt that it was a most important question and one deserving of the very best thought of all parties. It was felt that the N. F. A. represented such a diversity of foundry interests, including, as it did, machinery, malleable, radiator, agricultural and practically every variety of foundry, except the stove foundry, that it was impossible to devise any plan of differentiated wage rates which could be made general in application and at the same time do full justice to all interests.

This, in a general way, was the line of discussion, and it was finally decided to appoint a subcommittee of two from each side to collect statistics and data of the foundries comprising the membership of the N. F. A. and to classify them, if possible, so that the question of differentials could be more intelligently discussed; the committee to report before the third week in May. Messrs. Pessano, Penton, Perrine and Valentine were appointed to serve on the committee.

Discussion then turned upon the New York Agreement. It was mutually agreed that there was need for a clearer definition of its provisions. A subcommittee composed of Messrs. Pessano, Penton, Perrine and Black was appointed to consider same. This committee reported that they had agreed to report back certain amendments submitted by the representatives of the union on the committee with the understanding that the conferees of the association would lay them before their administrative council for consideration at their meeting in May. Their decision thereon to be communicated to the officers of the I. M. U. with a view to incorporating whatever final understandings are reached in the original agreement.

The propositions of the union were as follows:

Inasmuch as there has been some misunderstanding on the part of the members of the National Founders' Association and the Iron Molders' Union of North America, affecting both the obligations assumed by each party under the terms of the New York Agreement, and the status which shall be maintained, pending the application of the policy therein outlined,

the following explanatory clauses shall be considered hereafter as part of said agreement, to govern the actions of the members of the parties thereto in their future relations:

(1) The New York Agreement provides as follows: "That in the event of a dispute arising between members of the respective organizations a reasonable effort shall be made by the parties directly at interest to effect a satisfactory adjustment of the difficulty." The words "reasonable effort," herein appearing, contemplate negotiation upon the subject in dispute between the employer directly interested and the molders in his employ or their representatives, who shall make a serious effort to effect an adjustment. That failing, however, the member of the National Founders' Association involved in the dispute should properly receive and treat with the president of the Iron Molders' Union of North America or his duly authorized representative with a view to making a further effort at adjustment.

(2) When any change, whether of wage rate, shop practice or conditions, or any other change affecting the relations or the interests of the members of the parties to the New York Agreement is proposed by one of the parties thereto, to which objection or protest is raised by the other party, it is understood and agreed that the status originally existing, that is the status precedent to the proposed change, shall not be disturbed by either party pending reference and decision as provided in the New York Agreement.

The machine question proved, as anticipated, a very hard nut to crack. The representatives of the union took the ground that the molder should not be debarred as a machine operator and contended that on many so-called machines he would prove a more profitable operator. They complained that simple sucking devices used for drawing patterns on the bench had been called machines, and the foundrymen introducing them seemed to think that was sufficient justification for the employment of laborers thereon. On the other machines the operator required all the skill in the use of tools that molders did and were to all intents and purposes specialist molders and should be classed as such.

Every phase of the question was thoroughly discussed, the foundrymen holding to the view that men possessed of the limited skill necessary to operate some machines should not be put in the same class with competent journeymen molders and that where the skill of a molder was entirely eliminated by any mechanical device it would be absurd to say that a competent journeyman should be employed to operate it. In answer to a question they denied that the N. F. A. had determined as an association to refuse to employ molders as machine operators, but had agreed, on the contrary, that each member should decide his only policy. As a matter of fact, it had been found more profitable to employ journeymen molders on some molding machines. It was intimated that the system of differentiated wage rates previously advocated might prove a great aid in satisfactorily settling the question of machine operation by placing the operators in a different class from journeymen molders, and, further, that the tendency to limit output had militated severely against the molder as an operator. It was denied that the N. F. A., as an association, had taken any action which tended to discourage the employment of a molder as a machine operator; every member was left free by the association to define his own policy toward the machine.

The representatives of the union, while admitting that the machine operator might properly be subject to different classification from the skilled molder, held that it was absurd to class them all as laborers and unfair to grade their earning power upon that basis. They entered an emphatic protest against the definition of what constituted a machine in the estimation of some foundrymen who sometimes went so far as to call the simple match board, which had been known to the foundry for more than fifty years, a molding machine.

For reasons that must be apparent to any who have given the machine question close study, it was impossible to agree upon any general policy. It is understood, however, that any case brought to the attention of either association should be considered strictly on its merits and settled, if possible, by a joint committee of arbitration as hitherto.

A number of other matters of a local character were considered and the conference adjourned on the afternoon of the third day. As was stated in the beginning, the purpose of the conference was not to enter into further agreements binding each association to certain policies—the conferees on neither side were clothed with authority to do so—but it was designed to exchange expressions upon issues of vital importance in the relations of the N. F. A. and I. M. U. of N. A., at a time when it would be done dispassionately and with the knowledge that no specific case was depending for settlement on the decision. From the viewpoint of the union the conference was not entirely satisfactory, but it will at least follow that as a result of the meeting the coming convention will be better informed and will be enabled to legislate with a more intelligent knowledge and understanding of both sides of the important questions discussed.

STEEL CASTING CONSOLIDATION.

For some months a consolidation of steel casting plants has been under negotiation. The plan as it is now likely to be carried out revolves about the American Steel Casting Co. with plants at Chester, Pa.; Norristown, Pa., Sharon, Pa., and Alliance, O. The other plants to be included are those of the Leighton & Howard Steel Co. (formerly Shickle, Harrison & Howard Iron Co.), Granite City, Ill.; American Steel Foundry Co., Granite City, Ill.; the Sargent Co., Chicago Heights, Ill.; Benjamin Atha & Co., Newark, N. J.; Franklin Steel Casting Co., Franklin, Pa.; Reliance Steel Casting Co., Pittsburg. Two names have been suggested for the new corporation—the American Steel Foundries Co. and the American Steel Casting Co. The capital proposed is $40,000,000, divided equally between common and preferred stock, the latter being 6 percent cumulative.

The consolidation is promoted by Max Pam, of New York, and A. J. Eddy, of Chicago. The deal involves between $3,000,000 and $4,000,000. Judge E. H. Gary, C. M. Schwab, John W. Gates and Gen. Chas. C. Miller, of Franklin, Pa., are named as principal underwriters. Daniel Eagan, president of the American Steel Casting Co., has been mentioned in connection with the presidency of the new company, but it is stated that he will not accept an executive position.

Inspection of Steel Corporation Properties.

Last week President Charles M. Schwab, of the United States Steel Corporation, and a party of officials commenced a tour of inspection of the plants of the Corporation. The latter part of last week was spent in inspecting the plants of the Carnegie Steel Co., and a side trip was made to Vandergrift, Pa., to visit the plants of the American Sheet Steel Co. The tour of inspection this week will include the plants in the Wheeling district, New Castle and Youngstown, after which the plants in the Chicago and Milwaukee districts will be visited. The ore properties in the Lake Superior regions will follow, after which the Cleveland district will be visited and the party will return from that place to New York. In addition to President Schwab the party consists of the following: James Gayley, first vice president; W. B. Dickson, second vice president; Veryl Preston, third vice president; Joseph E. Schwab, assistant to the president; George G. McMurtry, president of the American Sheet Steel Co.; W. T. Graham, president of the American Tin Plate Co.; W. P. Palmer, president of the American Steel & Wire Co.; A. J. Major, president of the American Bridge Co., and P. W. Moen, vice president of the American Steel & Wire Co. On Saturday night President Schwab and his party were tendered a banquet at the Hotel Schenley. Manager E. W. Pargney, of the Kiskeminetas Valley plants of the American Sheet Steel Co., was presented with a handsome gold watch by Mr. Schwab for the faithful service he has rendered the company.

The bi-monthly wage settlements of the sheet, tin plate and bar iron scales were made this week with the Amalgamated Association of Iron and Steel Workers, but no changes in the present wages were announced. The scale of wages paid during the last two months will continue until July 1.

The strike of structural iron workers which tied up practically all the new building in the Pittsburg district was settled last week and the men returned to work on Monday morning, May 12. The men received an advance of 7½ cents an hour and will only work 8 hours per day. They formerly received 40 cents an hour and worked 9 hours per day.

U. S. CAST IRON PIPE & FOUNDRY CO.

The governing committee of the New York Stock Exchange has granted the application of the United States Cast Iron Pipe & Foundry Co. for the listing of $12,106,300 7 percent noncumulative preferred stock and $12,106,300 common stock in the unlisted department. The authorized capitalization of the company is $30,000,000, equally divided into preferred and common stock. Of the preferred there is outstanding $12,106,300 and $12,106,300 common. The company holds in its treasury $393,700 of preferred stock, and a similar amount of common. The balance sheet of March 31, 1902, shows:

ASSETS.

Treasury stock, common	$ 393,700	
Treasury stock, pref.	393,700	
	$ 787,400 Cost	$ 347,555.00
Unissued stock, half common and half preferred		5,000,000.00
Bonds of American Pipe & Foundry Co owned by us		306,000.00
Sinking fund for American Pipe & Foundry bonds		49,377.00
Plant investment and equipment	$10,011,464.82	
Good will, patents, etc.	14,055,100.00	
		24,066,564.82
Cash		172,793.35
Accounts receivable		1,831,830.06
Inventory, raw and manufactured material at cost		1,457,455.40
		$33,231,575.63

LIABILITIES.

Preferred stock	$ 15,000,000.00
Common stock	15,000,000.00
Six percent bonds of the American Pipe & Foundry Co., due 1928	1,500,00.00
Six per cent Anniston mortgage bonds, $17,500 due annually	87,500.0
Profits reserved for additional working capital in 1899	289,826.85
Accounts and bills payable	824,885.02
Balance	539,363.76
	$ 33,231,575.63

Properties of the Company.

The several plants, acreage, buildings, etc., are owned in fee simple and are without mortgage of any kind, except those formerly owned by the American Pipe & Foundry Co., and Anniston Pipe & Foundry Co., as shown below:

	Capacity per year. Tons.
Addyston Pipe & Steel Co., Addyston, Ohio, 160 acres, six lots	60,000
American Pipe & Foundry Co., Anniston, Ala., 110 acres	36,000
American Pipe & Foundry Co., Bessemer, Ala., 164 acres	50,000
American Pipe & Foundry Co., Bridgeport, Ala., 40 acres	18,000
Buffalo Pipe & Foundry Co., Buffalo, N. Y., 13 acres	25,000
McNeal Pipe & Foundry Co., Burlington, N. J., 225 acres	60,000
American Pipe & Foundry Co., Chattanooga, Tenn., 38 acres	36,000
Lake Shore Foundry Co., Cleveland, Ohio, 11½ acres	36,000
Ohio Pipe Co., Columbus, Ohio, 12⅓ acres	20,000
Dennis, Long & Co., Louisville, Ky., 11½ acres	50,000
Addyston Pipe & Steel Co., Newport, Ky., 22 lots	20,000
American Pipe & Foundry Co., South Pittsburg, Tenn., 16 acres	25,000
National Foundry & Pipe Works, Scottdale, Pa., 50 acres	60,000
Wisconsin Steel Co., West Superior, Wis., 135 acres	18,000
Total	514,000

Wisconsin Steel Co., West Superior, Wis., steel plant; capacity, 200 tons per day.

National Foundry & Pipe Works, Scottdale, Pa., blast furnace; capacity, 200 tons per day.

All engaged in the production of cast iron pipe and fittings and other castings, and amply provided with railroad connections. The plant at Burlington, N. J., has tidewater connections, and that at West Superior has lake connections.

NOTE.—Pipe foundries at Bridgeport, Newport and South Pittsburg, and the steel plant at West Superior are idle at present.

There is no bonded indebtedness of the United States Cast Iron Pipe & Foundry Co. Bonded indebtedness of properties acquired is as follows:

American Pipe & Foundry Co.—First mortgage, 6 percent, due in 1928. Authorized, $1,500,000. It is all outstanding but $306,000, this amount is owned by the United States Cast Iron Pipe & Foundry Co., and is in its treasury. Interest is payable in January-July of each year, and no default has been made in any of its payments. Sinking fund to meet the bonds of the American Pipe & Foundry Co. is payable $15,000 per annum in July of each year, and has always been met. Up to this date $45,000 has been paid to the Chattanooga Savings Bank, trustees of the fund, and they have it invested in bonds of the American Pipe & Foundry Co.

Anniston Pipe & Foundry Co.—First mortgage, 6 percent. Authorized $140,000. Outstanding, $87,500. Payable $17,500 in December of each year. No default in payment of principal or interest.

Board of Directors.—Samuel Thomas, New York; Colgate Hoyt, New York; A. H. McNeal, Burlington, N. J.; C. E. Burke, Cleveland, O.; George J. Long, Louisville, Ky.; A. C. Overholt, Scottdale, Pa.; George B. Hayes, Buffalo, N. Y.; E. C. Fuller, Columbus, O.; A. N. Brady, New York; B. F. Overholt, Scottdale, Pa.; A. Howard Hinkle, Cincinnati, O.; E. R. Thomas, New York. Officers: President, Samuel Thomas; first vice president, George B. Hayes; second vice president, A. F. Callahan; secretary and treasurer, B. F. Haughton; assistant to first vice president, E. C. Fuller.

A LATHE DOG FOR HEAVY WORK.

The illustration shows a 5-inch double screw straight-tail lathe dog especially adapted for gripping lathe work even heavier and longer than its full name. There is an increasing amount of heavy lathe work being done on large shafts, rolls, gun work, etc., for which massive engine lathes are used, and

THE BILLINGS & SPENCER CO.'S 5-INCH LATHE DOG.

these take exceptionally large chips and coarse feeds, requiring something stronger in the way of a dog than has hitherto been on the market. Large dogs of this general description have been heretofore exclusively made in castings, so far as our experience goes and the entrance of the dropforging people into this field is therefore a novel departure from current practice, that is, so far as the manufacture of big dogs.

It has become a well known fact that the situation between the makers of tool steel and the makers of engine lathes is a close parallel to the position occupied by the armor plate manufacturers and the projectile purveyors. Until a recent date, the lathe manufacturers have turned out lathes that were heavy enough and stiff enough to do all that the cutting tools could withstand. There have been of late, however, improvements in tool steel far surpassing previous practice and giving the cutting material much greater durability at high pressures, and in order to enable manufacturers to use these innovations to the best advantage, it is becoming necessary for the lathe builders to make heavier and stronger machines.

This development means a corresponding increase in the efficiencies of the lathe attachment, and taking these facts into consideration the Billings & Spencer Co., of Hartford, Conn., has deemed it pertinent to meet a demand for large dogs to do the work above described. The 5-inch dog as shown by the half-tone, weighs 25 pounds, and the 6-inch dog, which is made on exactly the same lines, weighs 35 pounds.

AMERICAN AND ENGLISH ENGINES IN A LONDON ELECTRIC LIGHTING PLANT.

Large extensions have been completed recently at the Bankside works of the City of London Electric Lighting Co. The works were formerly devoted solely to the generation of alternating current for public supply, with the exception of a limited amount of direct current generated by small series arc machines for street lighting. Many types and sizes of alternators have been in use at these works for years past and the comparative results obtained by long practice with the several designs of machines are of the highest value.

The new plant consists of five direct-current generating units. The electric machines are all of one type and manufacture. The steam engines are also similar, inasmuch as they are all of the vertical, cross-compound Corliss type, but three of them were built in the United States by the E. P. Allis Co., while the other two were built by Musgrave & Sons, in England. There is thus quite a British vs. American steam engine contest in the new power house at Bankside. The two classes of engine drive exactly similar machinery on similar loads—a better arrangement for the commercial comparison of two types of steam engines is hardly possible and doubtless the working results of the direct current power house plant will be most interesting and instructive.

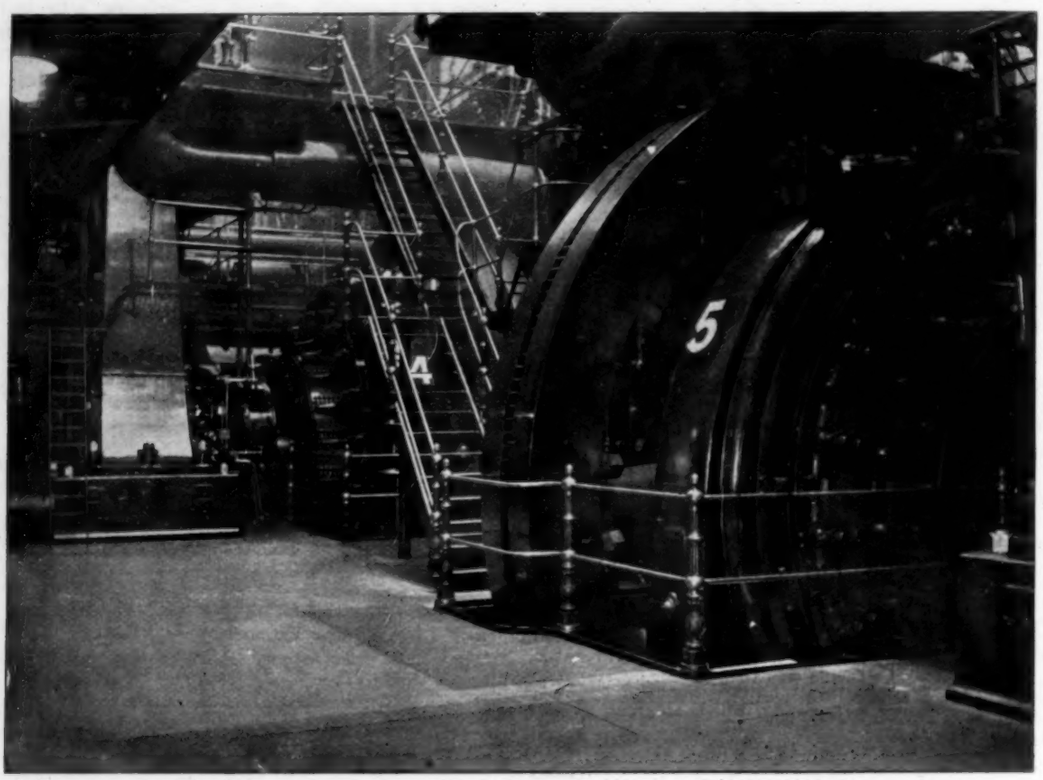


FIG. 1.—DIRECT-CURRENT GENERATOR, 1,800 K. W., DIRECT-CONNECTED TO ALLIS VERTICAL COMPOUND ENGINE.

The electric generators were supplied by the British Westinghouse Electric & Mfg. Co., Ltd., and are built in accordance with the well known standard Westinghouse designs. Two of the machines are each of the rated output of 1,800 k. w. at a pressure of 410-510 volts. The other three are 1,000-k. w. machines working at the same pressure and intended for parallel working with each other and with the larger machines. The latter are driven by the Musgrave engines while the three smaller ones are each driven by an Allis engine.

In Fig. 1 the generators numbered 4 and 5 are the larger ones. It will be seen that large as these machines are they are practically identical in form with small Westinghouse multipolar machines. The field consists of a cast steel ring carrying 20 pole pieces projecting internally. The pole pieces are built up of soft steel stampings cast into the field ring. The most rigid mechanical structure and efficient magnetic circuit are thus secured. The ring of the pole pieces is then accurately bored. The field ring is vertically divided and the halves set on guide plates on which they can be easily drawn apart. All parts of the armature and field are, by this means, readily accessible for inspection or repairs. The field is shunt-wound, each pole piece carrying a coil of the winding. The machines are all self exciting. The total height of the 1,800-k. w. machine is about 21 feet; its length along the shaft, 5 feet 3 inches, and its extreme width about 26 feet. The height of the machine above the floor line is about 9 feet 6 inches. The generator is built direct on the engine shaft between the high pressure and low pressure sides and close alongside a massive flywheel.

The engine shaft at the center is of three diameters. The largest, at the low pressure side, is 29¼ inches; the medium diameter is 29 inches and the smallest diameter, at the high pressure side, is 28 15-16 inches. The shaft is reduced by a further 1-16-inch at the high pressure bearing.

The armature and the commutator are both built on one cast iron spider which is shrunk and keyed on the shaft at the 29-inch and the 28 15-16-inch diameters. The spider is cast in four sections with two spokes or legs to each section. The hub is 37½ inches deep actually bored to fit the shaft on to which it is pressed over the key. Two rings are afterwards shrunk over each side of the hub, the diameters outside the shrink-rings being 47 inches and 57½ inches respectively. The flywheel is afterwards pressed into its position on the largest part of the shaft. On the inner side of the flywheel the hub is extended by a flange which projects over the hub of the spider and takes up its position against machined faces on the inner side of the spider arms. The flywheel flange is drilled in position to correspond with holes through the spider arms. The holes are reamed, and the spider and the flywheel are rigidly fixed together by eight 2½-inch diameter tightly fitted bolts between the spider arms and the flywheel hub.

The armature core is built up of sheets of carefully annealed steel clamped between cast steel end-plates. The core and the spider on which it is built are traversed by air passages so arranged that when the machine is running, a constant cooling stream of air circulates through the core and round the windings.

The armature conductors are carried in slots cut in the

periphery of the core. They are made of copper bars, forged to shape and insulated before being placed in the core slots where they are simply laid in position without any forcing, bending or hammering being necessary and secured by hard fiber wedges driven lengthwise into notches in the slots above the conductors. This form of construction ensures the best and most permanent insulation for the windings, places all parts of the windings within easy access and renders all inspection, repairs or renewals of any portion of the conductors possible without difficulty, with rapidity, and without disturbing any other coil or portion of the winding except that at fault.

A peculiar and important feature in connection with this generator is the provision which has been made in the armature, winding to secure sparkless commutation and cool running of the machine windings and parts. All the brushes of the same polarity are maintained at absolutely the same potential. In large multipolar machines it is very difficult, if not impossible, to keep the magnetic strength of all the poles equal. There will always be found a more or less great inequality in the strength of the poles which may be due to a variety of causes, mainly causes which cannot be annulled. That being so, any method or device by which the effects of such causes can be counteracted or neutralized is not only desirable but extremely valuable, inasmuch as the efficiency and life of the machine are thereby considerably improved. The method adopted in Westinghouse large-sized multipolar direct-current machines is simple and ingenious and is protected by patents. Certain points in the armature windings which are normally at equal potentials are connected together by additional conductors, so that any difference of potential between the points so connected and produced by want of magnetic balance is followed by a flow in one direction or the other through the additional conductors. These currents are alternating in character and interact on the field magnets either demagnetizing or magnetizing them to the necessary state of balance. The currents, therefore, which are occasioned by the want of magnetic balance do not pass by way of the brushes and sparkless running is secured. Another important effect is that should the armature be out of center in the field, not only are the armature currents equalized and a sparkless condition secured, but the heavy magnetic pull of the armature on the side nearest the poles is prevented and no undue wear and heating in the bearings is produced.

The steady, sparkless running of the new generators at the Bankside Works is particularly noticeable. The commutator is constructed of the best hard drawn copper segments insulated by specially prepared mica sheets of such corresponding hardness that an even wearing surface is exposed to the brushes. Carbon brushes are used; they are tightly secured in spring brush-holders and clattering and vibration are quite prevented. The brush-holders are arranged in sets of eight carried on rigid brackets supported in turn from a continuous ring which is concentric with the field ring. The brush or rocker ring is held by brackets close to the field ring; thus leaving the outer end of the commutator free and open for attention or cleaning. The lead of the brushes is adjusted, for all simultaneously, by a hand-wheel which connects through rods and bevel gearing to the brush ring.

The finished armature of the machine is some 12 feet in diameter and 3 feet deep; the commutator being about 10 feet in diameter by 22 inches wide at the collecting face. The total approximate weight of the complete armature and commutator is 85,000 pounds

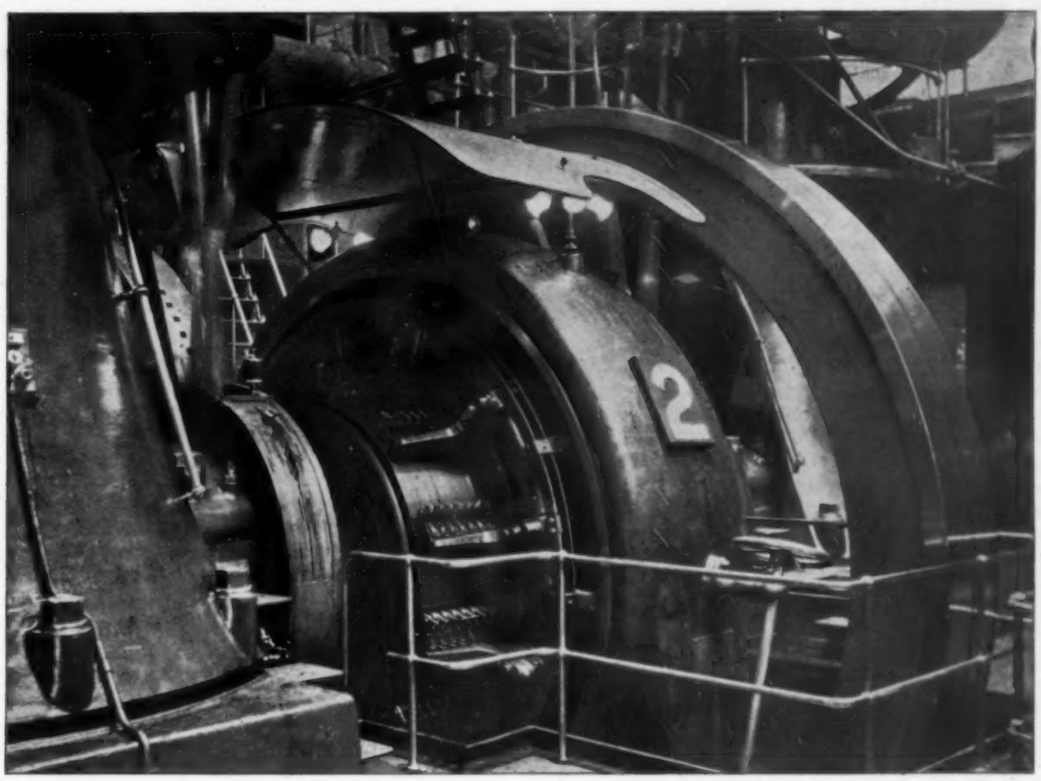


FIG. 2.—DIRECT-CONNECTED GENERATOR, 1,000 K. W., DIRECT-CONNECTED TO MUSGRAVE & SONS' ENGINE.

The two larger generators have each a rated capacity of 1,800 k. w. at 410-510 volts pressure running at a speed of 75 revolutions per minute. The three smaller ones yield 1,000 k. w. at the same pressure running at a normal speed of 90 revolutions per minute. All the machines have, moreover, a large overload capacity; overloads of 50 percent can be maintained for considerable lengths of time without undue heating of the generator or risks of breakdown occurring.

The machine shop and a section of the foundry of William and Philip Medart's pulley plant in South St. Louis was destroyed by fire, May 4. Loss estimated at $300,000, partly insured.

The Magnus Metal Co. is contemplating improvements at Fortieth St. and Emerald Ave., Chicago, to cost $70,000.

The Wabash Bridge Co., Wabash, Ind., has taken a contract for the erection of five steel bridges for the Cincinnati, Richmond & Muncie Railroad, calling for about 8,000 tons of material.

THE EFFECT OF ANNEALING SHOT OR CHILLED IRON IN DETERMINING PHOSPHORUS.*

BY CHARLES E. MANBY.

It is somewhat interesting to reflect that ten years have already passed since the writer introduced the "alkali method in the determination of phosphorus," and although a few modifications have presented themselves, yet the essential part remains; *i. e.*, titration of the yellow precipitate with alkali and using for an indicator or end point phenol-phtalein, which produces a red or phenicine, which produces a blue color in excess of alkali.

In the proceedings of this society, Vol, 9, Part 6, is an article by Mr. McKenna, entitled, "Some Sources of Error in Phosphorus Determinations" proving with the most exact figures that oxidation with permanganate gives lower results on "shot" samples than by evaporation and baking, but no remedy for this evil, at that time, was sought for; it was generally accepted as inevitable, and so it rested to the present day; and now we have hopes that we can, by mere annealing, obtain the desired result. When a chilled sample of pig metal is dissolved in nitric acid there remains an insoluble residue holding phosphorus which is unacted upon by the oxidizing agents at the boiling point, but by going to dryness and baking to destroy all nitrates, ultimately taking up with hydrochloric acid we obtain all the phosphoric acid in a state favorable to the precipitation with the molybdic mixture.

Annealing, therefore, changes the conditions of solubility, and is practiced as follows: Place two grammes of the sample in a platinum crucible over a Bunsen flame and bring to a bright red heat for two minutes, occasionally stirring with a rod; it is well to continue the flame by raising the Bunsen to the lid of the crucible and at the same time point the flame downwards against the lid, which, at this moment is removed, and the gas flame will burn on the surface of the crucible and thus exclude all air from entering or causing unnecessary oxidation of the annealing sample at the moment it is cooling off.

The following is the method in detail of analysis. Transfer the annealed sample to an Erlenmeyer flask, capacity 500 c. c.; add 40 c. c. hot water, then 15 c. c. strong nitric acid and when the violent action has ceased add 10 c. c. strong hydrochloric acid and allow to simmer gently on the hot plate for five minutes; then add 10 c. c. of a saturated solution of permanganate of potash. This will produce a brown precipitate of manganese-oxide which gradually redissolves in the hydrochloric acid already added, if the temperature is maintained near the boiling point. If not cleaned up within ten minutes and a few more drops of hydrochloric acid and sodium nitrite solution (50 grammes per litre.) Remove from the plate, dilute slightly and filter off graphite.

To filtrate add 20 c. c. strong ammonia and shake; now add 18 c. c. strong nitric acid and place on the hot plate to clear up at the boiling point; if not clear, add a few drops of sodium nitrite solution, remove from the plate and cool off between 90 degrees and 95 degrees C. The amount of solution at this stage should be about 100 c. c., for if too concentrated, then the precipitate separates too quickly and gives a fine precipitate troublesome to filter.

This point of proper dilution is important in promoting a granular precipitate which settles quickly and filters rapidly. A small line on one of the flasks at a 100 c. c. mark will be a sufficient guide to level up by when running many determinations together. As previously stated, 90 degrees to 95 degrees C. is the best temperature at which to add the 70 c. c. molybdic acid mixture. It is not necessary to use the thermometer each time, because two flasks at a time can be removed from the plate during the boil and by shaking off the live steam and then adding the 70 c. c. molybdic mixture the results are perfectly uniform and give results which do not vary .001 percent phosphorus. After the molybdic mixture has been added, shake a few times at intervals. The filtering can be started in ten minutes from the time of adding the precipitant. Wash twice with 1 percent nitric acid wash water, then with a 2 percent solution of sodium nitrate until free from acid, using for an indicator a solution of three drops standard alkali for litre of water and three drops phenol-phtalein. Use a small porcelain crucible filled with this colored indicator and allow a few drops of the filtrate to fall into it, which will maintain its pink color if sufficiently washed but bleaches immediately as long as any free acid remains on the filter.

In practice about 70 c. c. of wash water should suffice. Remove the filter and place in an eight-ounce Erlenmeyer flask provided with a rubber stopper, now pour in about 30 c. c. water previously sensitized with alkali and phenol-phtalein, insert the rubber stopper and shake until the filter proper breaks up. At this stage the solution is a canary yellow; then run in from a burette the standard alkali until the yellow color changes to red, again shake and add a few drops of a saturated solution of phenol-phtalein in alcohol, and which is also previously sensitized with sufficient alkali to produce a ruby red. The phosphorus solution will now assume a deep carmine due to excess of alkali, titrate back with standard nitric acid until the pink is bleached; lastly add alkali to the point where one single drop restores the solution to a light shade of pink. If preferred, the excess of alkali may be added previous to the 30 c. c. sensitized water, but always be cautious to have an excess of alkali before adding the strong solution of pheno-phtalein else it will produce an off color of a greenish tint due to part reduction of molybdic acid. Now, take the readings of the two burettes and the difference gives the percentage of phosphorus when divided by 100. The following results are given as a comparison with the different methods:

Chilled Iron, Phos.	Same, Annealed, Phos.	Gravimetric, Phos
.594		
Sample 1	.108	.108 and .06
2	.083	.083
3	.099	.100
4	.090	.091
5	.095	.092
6	102	.105
7	.093	.095
8	.090	.090
9	.086	.084
10	.093	.095
11	.085	.090
12	.092	.094
13	.078	.080
14	.320	.329
15	.302	Baked and titrated .304
16	.292	" " " .295
17	.250	" " " .252
18	.280	" " " .280
19	.280	" " " .280

By "gravimetric" is meant the regular method, *i. e.*, the sample is dissolved in nitric acid (1.20) evaporated in dish to dryness and baked, taken up with strong hydrochloric acid, the excess of acid evaporated off then 5 c. c. strong nitric to decompose any excess of hydrochloric acid—then dilute and filter off silica—the filtrate is then made alkaline with 20 c. c. ammonia then acidified with 18 c. c. strong nitric—then heated up to 90 degrees C. to 95 C., and molybdic acid mixture added to precipitate the phosphorus. Filter on a tarred filter with 2 percent nitric acid, wash till free from iron; dry between blotters and place in an oven to dry for 1 hour at 125 degrees C.

"Baked and titrated" means the sample was treated in the same way as "gravimetric" as far as going to dryness and baking and precipitating—not filtered on a tarred filter, but finally washed with nitrate of soda wash and then titrated.

In the course of these experiments the writer finds there are indications with samples of high phosphorus iron with two-tenths percent and upwards of variations when weighing the yellow precipitate after drying at 100 degrees C. and these results are higher than those by titration. See No. 14 sample. This, the writer attributes to the presence of nitric acid held in the precipitate when washed with 2 percent nitric acid and which is not removed by drying at 100 degrees C.

If nitrate of soda wash water is used for a final wash the titration shows that no nitric acid remains. In making up the molybdic solution it is the writer's practice to purify the ammoniacal solution with a few drops of bromine and filter off the impurities, after which it is poured slowly into hot 1.20 nitric acid. The solution assumes a yellow tint when cold, due to the excess of bromine, and it has the advantage of preventing free molybdic acid separating out at a temperature of 90°-95° C.

Furnaces A and B, of the Tonawanda Iron & Steel Co., North Tonawanda, N. Y., are idle on account of a strike.

* Paper read before the Chemical Section of the Engineers' Society of Western Pennsylvania.

NEW YORK MACHINERY MARKET.

NEW YORK, May 12.—The present month ought to be productive of considerable activity in the machinery market in this section, judging by the numerous inquiries that have marked the past ten days. Houses whose connections generally reflect the condition of trade, report these to be unusually large, and all the more encouraging because they emanate from many quarters. Nearly every branch of the machinery world is represented in current inquiry, with power transmitting machinery markedly prominent. Many concerns are planning improvements to their plants and new building in industrial lines will be active in the next few months, the only drawback being the inability to get material with any degree of promptness. This is especially true of iron and steel structural material, concerning which assurances are confidently given that the amount used this year will show a surprisingly large increase over last year.

Proof of Mr. Charles Churchill's statement that American machinery and tools were never in greater demand abroad than now, is afforded by inquiries made of local houses during the past week. At the New York office of the Niles-Bement-Pond Co. some very gratifying inquiries were received from Great Britain for tools.

The Wheeler Condenser & Engineering Co., with offices at No. 120 Liberty St., recently executed several large foreign orders in cooling towers, feed water heaters, surface condensers, and centrifugal pumps. One of the largest shipments was to the Carlton Iron Works in London. It has also furnished considerable machinery to companies operating collieries throughout the United Kingdom, particularly in Wales. The company will exhibit some of its machinery at the forthcoming American Exposition to be held in London.

At the offices of the American Machinery & Export Co., No. 120 Liberty St., a large order was received from the Wellington & Manowater Railroad Co., Ltd., of Wellington, New Zealand. It consisted of punching machines and lathes for installation in the company's shops in New Zealand. Although American capital for industrial enterprises in the Philippines is not available, for obvious reasons, so many inquiries for machinery of American manufacture have come to it from Manila that the above company recently sent a representative there to ascertain the outlook for business. The information has come that several saw mills will be erected in the Philippine Islands, and the export company expects to get the orders for the necessary machinery and tools.

H. P. Lasch, of Selig, Sonnenthal & Co., London, who makes American machinery a specialty, and who has been in this country for the past six weeks, sailed for home last Saturday. In commenting upon his visit to this country, Mr. Lasch said to the writer: "We had several large orders for American equipment, and I came to America for the purpose of giving my personal attention to their execution. In visiting some of the shops in this country, I was surprised at the notable strides which have been made in machinery and tools. I have every reason to believe that when I communicate the details I have noted to our customers, the prospects of getting some good orders will be bright. American manufacturers should avail themselves of every opportunity to exploit their products abroad. I have no hesitation in saying that if European houses were more familiar with their merits their sale would be larger. This is especially true of your machinery and tools."

At the New York offices of Schuchardt & Schutte, No. 120 Liberty St., it was said that the business of supplying metal and woodworking machinery abroad, of which the firm makes a specialty, is very brisk now. Several large orders for this class of products were recently received, and the outlook for more in the near future is said to be very bright.

Thompson, Son & Co., manufacturers of electrical and steam machinery, formerly of 105 Liberty St., but now of 116 Liberty St., report an unusually good business of late. Domestic trade is of the most satisfactory character, but the firm notes that the export trade is not what it should be.

The A. & F. Brown & Co., of No. 25 Dey St., manufacturer of general machinery, says that its business is moving along on healthful lines. This firm has always been active in power transmitting machinery, and never more so than recently. The New England trade is of particularly large proportions nowadays.

The Oil Well Supply Co., of No. 31 Church St., which furnishes the necessary machinery and tools for the production of oil, is rushed with orders at present, in consequence of the marked attention given this industry recently. The discoveries of oil which have been noted in various sections of the country during the past year have been chiefly responsible for the many large orders received. A member of the above firm said that oil is being produced in such great quantities nowadays, that it is soon destined to take a prominent place alongside of coal as fuel, both in point of cheapness and efficiency, and that as a result several factories, to his personal knowledge, are contemplating its introduction.

The plant of the Pioneer Iron Works, at William and Imlay Sts., Brooklyn, and one of the largest concerns of its kind in that city, is forced to be in operation day and night to fill the orders on its books. It is now making a large quantity of machinery for a company recently formed to engage in the asphalting business. For some of this patents have recently been secured, and it is said that its use will effect considerable saving in that line.

The Union Mfg. Co., of No. 103 Chambers St., reports a better business now than at any time in the past two years. It is several months behind in deliveries of small tools.

The Railroad Supply Co., of No. 116 Liberty St., says that railroads are buying a large amount of air and track tools. This company has been favored with several good orders in this connection recently.

The C. & C. Electric Co., of No. 143 Liberty St., has considerable difficulty in filling orders for dynamos and motors, despite the fact that the company's plant at Garwood, N. J., is being run to its utmost capacity. Campbell Scott, of the company, says that its export business has fallen off considerably of late, in consequence of German manufacturers offering their products at cost. The latter have great quantities of goods on their hands, as the result of the industrial stagnation which prevails in that country at present.

The New Columbia, Pa., Pipe Mill.

The Susquehanna Iron & Steel Co., Columbia, Pa., has already broken ground for the erection of a large lap and butt weld pipe mill at Columbia, which will consume a large portion of the skelp from its present mills. The main mill building will be 300x90 feet, while the tnreading shop will be 500x50 feet. The power house will be 180x50 feet and the producer house, which will contain eight water seal gas producers will be 140x30 feet. In the main building will be installed one lap weld mill for sizes from 2 to 10 inches, while the butt weld mill will produce pipe ⅛ to 2 inches. The entire plant has been so laid out that it can be duplicated at any time, plans for which have already been prepared for a site adjoining the present mill site. Victor Beutner, who was formerly connected with Julian Kennedy, and who has offices in the Westinghouse Building, Pittsburg, has designed the plant.

Gas as a Fuel for Brass Furnaces.

One of our correspondents in a recent letter refers to his experience with gas as a fuel for brass furnaces and says that he has found that gas in any form is not the best fuel for melting brass in crucibles, as it destroys these to such an extent as to more than overbalance any gain which might be made with a cheap supply of this fuel. In his opinion nothing equals coke for real economy and we should like to have those of our readers who have had the experience of melting brass with gas or fuel oil give their opinion on this subject.—[The Foundry.

James Stewart & Co., St. Louis, have completed a chimney about 250 feet high for the new power station being built by the British Westinghouse Co. for the Mersey Ry. Co. at Liverpool. This work was begun just before Jan. 1, 1902, and is claimed, together with the construction of the British Westinghouse Co.'s new plant, also built by James Stewart & Co., as the best record in England for rapid brick laying.

SUGGESTED AT THE SHOP.

BY F. O. REMAN.

An English lathe dog, or carrier as they call it over there, is going the rounds of the papers. It is made by a Sheffield firm, George Turton, Platts & Co., and is the subject of a recent patent. The description in *Engineering* says: "Figs. 1 and 2 show the carrier at rest; Fig. 3 shows it in actual work. This carrier is simply slipped on to the shaft which is required to be machined, and the work is then put into the lathe, with the shank of the carrier in front of the driving pin in the faceplate of the lathe. When the lathe is started, the driving pin catches the carrier, which automatically tightens itself on the work. This entirely dispenses with the loss of time which is entailed by the workmen having to tighten up screws as in other carriers. When small work in large quantities is being machined, this saving of time must amount to a considerable item. The more pressure that is applied only causes the carrier to grip tighter, and cuts have been applied which stop the lathe and throw off the belt without in any way causing the carrier to lose its hold. All the parts are made of a high class of steel, with the working parts case-hardened, so that each carrier will have a very long life if used with ordinary care."

* * * * *

I suppose that if the description means anything there are a number of places where money can be saved by this dog being put to use at once. I dare say that there are people anxiously waiting for one of these wabbly affairs to stick on the end of a shaft and lay up treasure, but I have not met them yet. There is a right and a wrong side to the thing and I can well imagine the amount of fun that the average lathesman would have as he found the dog in the lathe with the pin pushing the arm of the cam the wrong way. Would he not say things and how he would enjoy taking out the piece of work and yanking the new dog around for another start.

* * * * *

If the scheme is going to work at all there must be a steady pressure kept up on the projecting arm, or in canine phrase, the straight tail, and a certain amount of work must be done on the shaft to keep up the grip of the dog. All work is not done that way in the lathe and a projection may stick out on one side for some heavy chips and alternate air cuts when roughing out the shaft, or whatever it may be that is on hand. If the work is not balanced nicely and the aforesaid air cut happens to be so arranged (and things are usually so fixed that the unpleasant coincidences have a very annoying habit of matching very closely at unexpected times) that the weight of the unbalanced portion and the time of the air cut should join their forces at the one instant and the dog would run away from the pin in the faceplate and loosen up on the work. I realize that the centers can be set tight enough to stop this, but they might not be so applied.

* * * * *

Cutting threads would be out of the question. The scheme would not reverse anyway and on other work where the machinist would expect to turn the job back and forth on the centers for any purpose whatever the tool would be out of joint. On rough work the thing seems risky and no one can afford to take chances with a mongrel dog. The sound breed with a good pedigree is the only one worth a license in the machine shop kennel.

* * * * *

A number of years ago I ran across a tool of this type in these United States. The sketch in Fig. 4 will show what I remember of the scheme. Here are two screws and a swiveling toothed cam, set in a circle. The screws are plain thumb-screws and when they are set down on the work they hold tight enough to grip the shaft, and when a great strain comes on the cam moves slightly and the teeth take a bigger bite. The main feature of the thing is the fact that these screws can be tightened by hand without a wrench and I dare say can be tightened enough to hold the dog when the work is being turned backward for inspection and would hold through an occasional air chip on very rough work. The scheme seems ahead of the other design and in the neatness of the arrangement it is much more trim and workmanlike from my point of view, but I would not risk it in screw-cutting nevertheless.

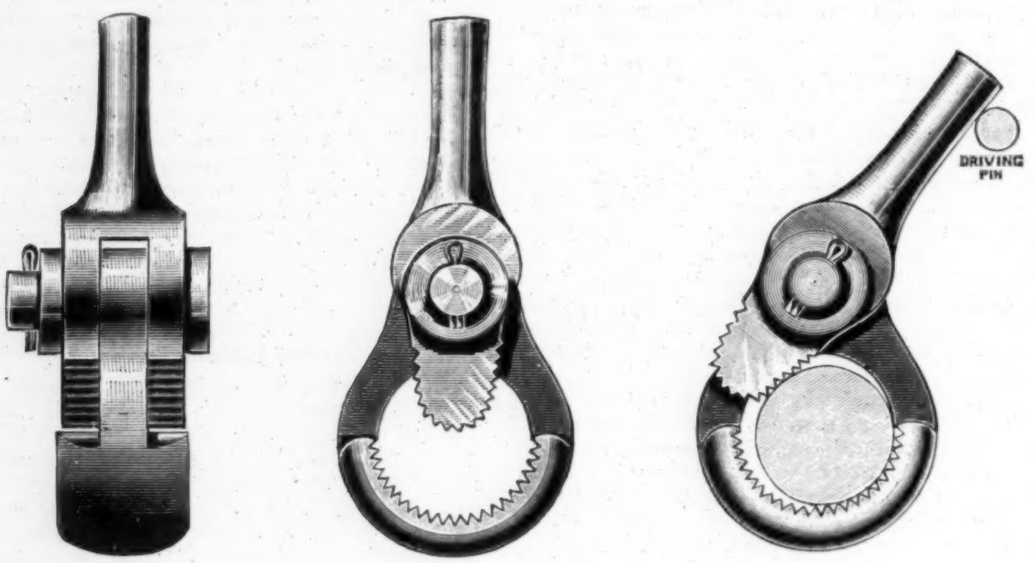


Fig. 1. Fig. 2. Fig. 3.

AN ENGLISH LATHE DOG.

* * * * *

The tool in Fig. 4 was known as the "bulldog" and I have seen or heard nothing of it for several years. Perhaps the name killed it, but whatever the cause may have been it has dropped out of sight during my wanderings among machine shops. There is one reason for this disuse of a tool that may interest the many who have just such ideas for the improvement of shop appliances. So far as I can see, each of these inventions, from Figs. 1 to 4, will cost more than the common lathe dog; they have more parts and will wear out sooner because of the teeth getting dulled or broken by rubbing on hard stock, etc. The man who gets up a new thing mainly because it is a novelty may find some trouble in selling it for that reason. The men who will buy anything because it is new and nothing more are leaving the business of running machine shops to other people.

* * * * *

Sometimes a thing may be out of the question because it is not easy to make it in the shape required by the conditions. A square hole in a pulley or gear fitting on a shaft of the same shape would make a positive drive, but the task of finishing the two parts would be too expensive compared with other methods of doing the job. It might be a good plan to

have a lathe fixed to turn oval and then the shaft and the bore could be finished in the same way, and this too would hold the two parts so that they would stick together in good style. The trouble of this sort of thing is a bar to its ever being common, however.

* * * * *

The *Patent Office Gazette* shows a method of fastening shafts to the cams of stamp mills which comes within a measurable distance of this class. It is shown in Fig. 5, a being the shaft and d the hub of the cam. The hub has an opening on one side of the bore which does not extend more than half way around the shaft. This opening is curved eccentrically, that is, the curve is struck from a different center than the axis of the shaft, and a wedge b, having the one side fit the shaft and the other fit the outer curve, is fitted to this opening. The wedge b is thus different from the ordinary everyday key because it is tightened by being moved around the shaft and the average key is driven endwise of the bore. The idea in practice would appear to have the same action as the lathe dogs already shown. In one direction of rotation the thing would tighten up just as in the other direction it would be likely to loosen its grip. But this objection would not seem to be of much account in a stamp mill where the pressure comes in the one direction all the time.

* * * * *

Where the puzzle comes in would be the way to do the work

FIG. 4.—ANOTHER LATHE DOG.

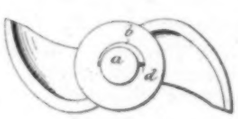


FIG. 5.—A CAM AND KEY FOR HEAVY WORK.

of fitting up the parts, the key and the hub. If the key is a part of the shaft, a key-shaped boss, then a nice piece of planing is in order. If the key is a separate piece it can be made in the form of a tube. The inside nicely bored and reamed and then mounted on an arbor, with centers placed eccentrically, and the outside turned to gauge. The tube can then be split up into halves and the two keys are finished. Finishing out the bore of the hub d would be a trifle more difficult matter. The hub could first be bored out to fit the shaft and then the recess would have to be cut on a slotter with a rotating table or a planer to get that awkward curve. The trouble of getting the centers of these different curves so that they would be in the same plane and the key, shaft and hub, fit nicely at each part of the surfaces intended to be in contact would amount to something, but no machinist worthy of the name would give it up in disgust by any means, though he would be sure to puzzle out a good many other ways to get the desired result before he reached the end of the job.

* * * * *

The fitting of ends to means plays sad havoc with many an enterprise. I remember having some presses making hollow metal balls, mere shells. These were cupped out of blanks and then closed in by other operations. A local inventor having some acquaintance with the owner of the factory came in one day and watched the process with deep interest. The problem was too much for him to retain long and he unburdened himself as follows: "Say, I could show you a better way of making them things." I took a look at the presses to make sure that nothing was out of gear and replied: "That so? How do you propose to do it?" "Why, I would form them up on a piece of steel just the shape of the inside of the balls." He was starting in to tell me how nicely finished and symmetrical the job would be when I broke him up with the inquiry as to how he would get the steel arbors out of the balls.

OBITUARY.

John D. Evans, until a short time ago superintendent of the tin bar mill of the Sharon Steel Co., Sharon, Pa., died at his home in Sharon on Thursday, May 8. He was born in Pittsburg May 26, 1851, and while yet a boy went to Scranton with his parents, entering the employ of the Lackawanna Steel Co., and at the age of 16 was a roller. Later he went to Chicago and began work with the Illinois Steel Co. Some years afterward he went to Duquesne, Pa., where he accepted the position of night manager of the rolling department of the Carnegie Steel Co. About five years ago he went to Youngstown and entered the Ohio plant of the National Steel Co. as night manager. He held that position until about a year ago, when he went to Sharon as superintendent of the tin bar mill of the Sharon Steel Co.

Joseph B. Renshaw, a well known inventor, died at his home in Hartford, Conn., May 4, from the debilities of old age. He was born at Dodge Hill, Heaton Norris, Eng., July 13, 1822. In 1847 he emigrated, locating first in New York and then in Detroit, where he entered the employ of the Michigan Central Railroad and became the master mechanic of the shops at Michigan City, Ind. About 30 years ago he went to Hartford. He was associated with Pratt & Whitney, whom he had known soon after arriving in America. While with this firm he conceived the Renshaw ratchet, a device still manufactured in the small tool department of the Pratt & Whitney Co. Later Mr. Renshaw removed to Cleveland to enter the service of Warner & Swasey, and while with them he conceived many of the mechanical appliances that entered into the telescopes made by that firm.

In the casting of molten metals he perfected a gate which employed centrifugal motion for cleansing the hot metal of foreign matter. He secured patents for a method of doweling for wood and iron patterns, and a low heat hardening material for making low grade irons strong, and these inventions he manufactured under the name of the Foundry Supply Co., of which he was manager. A draughtsman's divider and a machinist's micrometer depth gauge were inventions which followed, and later came a stay bolt cutter for use in locomotive shops. A year ago Mr. Renshaw conceived an idea in a ratchet to replace the one he had earlier invented. Patents were recently granted to him for this invention. He is survived by his wife, five daughters and one son, William, superintendent of motive power of the Illinois Central Railroad, Chicago.

T. E. Bolton, proprietor of the Standard Boiler Compound Works, Chicago, died suddenly, in his office, May 10 at the age of 70 years.

For centuries the Dannemora iron ore mines in Sweden have been famous. It is there that the purest iron ore commercially known exists. The operating company is a close corporation, and the ore is sold to no one outside of it; that is, the owners all possess iron or steel producing plants, and obtain from these mines part of their supplies. They limit the production to 50,000 tons per annum, and place it at a price which might seem prohibitory, but from its quality they can afford to so charge themselves. The ore, which now comes from entirely underground operations is magnetite, with an average of 50 percent of metallic iron, and from 0.0025 to 0.005 percent phosphorus. It requires very little flux in the blast furnace, as the gangue is principally limestone, and the phosphorus is of that minute quantity which generally leads one to doubt the chemists' reputed results. The mine has been operated for at least 400 years. At first it was owned by private parties, but later reverted to the government. In 1863 it was again taken by individuals, and has been successfully worked ever since.

CHROMITE AND CHROME ORE PRODUCTION IN 1901.

The production of chromite is discussed by Dr. Joseph Hyde Pratt in "Mineral Resources of the United States, 1901," published by the United States Geological Survey and now in press. Although but little chromite, the source of chromic iron ore, has been mined in the United States during the last few years, some of its recent uses should cause deposits not now worked to become productive. The metal itself, chromium, is not used directly in the arts. The mineral chromite is used in the manufacture of brick for basic open-hearth furnaces. In one furnace over 400 heats were turned out before the chromite brick lining had to be replaced. Chromite has been successfully tried also as a hearth lining for water-jacket furnaces in copper smelting; and its merits are that it is infusible, that it does not become friable when heated and cooled, that it is not affected by sudden heating and cooling, that it is not attacked by the products formed in the fusion of the copper ore, and that, being so hard, it wears away very slowly under the flow of the fluids over it. It has been thoroughly tested at the Elizabeth mine, at Stratford, Vt., and is about to be tried at the Ducktown furnaces at Ducktown, Tenn. Dr. Pratt thinks this use should produce a demand for the chromite ores of North Carolina, which would be available for the smelters in the Virgilina copper district of Virginia and North Carolina, the Ore Knob and Gold Hill copper districts of North Carolina, and the Ducktown district of Tennessee. The chromite deposits of California should, in the same way, become available for the same purpose in the copper districts of Arizona, Utah and Montana.

The principal use of chromium as an alloy is as the ferro-alloy, used with ferro-nickel very largely in making chromic steel for armor plate and armor plate piercing projectiles, for trolley car wheels, crusher jaws, stamp mill shoes, safes, etc. Chromium in the presence of carbon makes steel intensely hard. The ferro-chromium alloy has to be produced under intense electric heat from high grade ore low in silica; and one of the largest companies manufacturing the ferro-chromium is the Wilson Aluminum Co., whose works are located at Holcombs Rock, Bedford County, Va., and at Kanawha Falls, Fayette County, W. Va., where there is abundant water power for the production of electricity. The chief use of chrome is in the production of chromate and bichromate of potash, and as coloring pigments in producing shades of buff, red, brown, and black in the manufacture of textiles, pottery, etc.

Chromite has been found in quantity in Pennsylvania, Maryland, North Carolina, and California. The North Carolina deposits are near Burnsville, Yancey County, near Dark Ridge trestle on Dark Ridge Creek, Jackson County; and 16 miles northwest of Asheville on Big Ivy Creek, Buncombe County. The California deposits are found in Alameda, Calaveras, Del Norte, Fresno, Mendocino, Napa, Placer, San Luis Obispo, Santa Clara, Shasta, Sierra, Sonoma, and Tehama Counties. By far the greater part of the chromite used in the United States is brought directly from the deposits of Asiatic Turkey. The New Caledonia deposits are beginning to be worked to some considerable extent; the Canadian chromite deposits in the Black Lake region of the Province of Quebec, and the deposits of Bluff Head, on Fort au Port Bay, west coast of Newfoundland, are also producing.

The value of chrome ore depends upon its percentage of chromic oxide. The standard ore contains 50 percent of oxide, and increases in value from 75 cents to $1 per ton for every unit above 50 percent, the price decreasing in much greater proportion for every unit below 50 percent. Since 1896 there had been scarcely any production of chromite in the United States, until 1901 when California produced 368 long tons, valued at $5,790. The imports of chrome ore in 1901 were 20,112 long tons, valued at $305,001, as compared with 15,793 long tons, valued at $284,825, in 1900. The domestic production will probably increase considerably in the immediate future.

The C. & C. Electric Co., of Garwood, N. J., has taken a good sized English order for motors through C. R. Heap, 47 Victoria St., London.

NEW AXLE-MAKING MACHINE TESTED.

In the presence of President Schwab and various officials of United States Steel Corporation companies, the new axle making machine, in the process of development for the past eight years, was successfully tested at the Homestead plant of the Carnegie Steel Co., Homestead, Pa., last week. The machine is the invention of Mr. C. Mercader, and is fully covered by patents which have been assigned to the Carnegie Steel Co. The test was highly successful and in the near future axles made by this machine will be placed on the market.

The axle is not hollow throughout, as has been frequently reported, but only to a depth of about 30 inches from either end, the section between being solid. The machine operates on the principle of a hydraulic press, there being two dies between which the round blank is pressed into the shape of the axle. Two punches operate at both ends of the blank simultaneously and penetrate the blank to a depth of 30 inches, the action of the punches being to expand the round blank whose diameter at the center is equal to that of the finished axle.

During the tests made last week axles were turned out in slightly less than two minutes, entirely free from scale, of exact form, requiring no straightening after being punched. Furthermore, the ends being perfect, need not be trimmed off, as is the case with the forged axle, thereby working a saving of scrap amounting to 15 percent. In addition there is a large reduction in the weight of the axle. The weight of the standard M. C. B. A. 100,000 pound axle is reduced by 115 pounds by this new process and the tests of the axle show it to be far superior to those required by the Pennsylvania Railroad for the standard axle.

The round blank after receiving its finishing pass is cut into the exact axle length, and after again being heated is placed in the die, which has the form of the rough axle. The action of the dies and punches penetrates to every portion of the round. The center of the axle which does not receive the work of the hammer as it should by forging is fully taken care of by the new method and the interior of the axle made by this process shows a very fine grain, due both to the action of the punches operating on both ends and the pressure of the dies.

After leaving the dies the axle requires very little machining, which again means a very great saving. The inventor and those who have seen the axle and the process are of the opinion that with reduced weight, smaller cost of manufacture and greater strength it will ultimately entirely replace the present forged axle in use not only in this country but throughout the world.

Hartman Mauufacturing Co. Sale.

The plant and the entire interests of the Hartman Mfg. Co., New Castle, Pa., were sold at public auction last week. The New Castle plant was sold for $160,000, while the property of the company at Ellwood City, Pa., was sold for $3,000. All the interests of the company in the Cuyahoga Steel & Wire Co., of Cuyahoga Falls, O., were sold for $75,000. The properties were purchased by a representative of Charles M. H. Ward, of New York. Immediately following the sale it was announced that the property would be taken over by the Cuyahoga Wire & Fence Co., of Cuyahoga Falls, O., which was recently incorporated with a capitalization of $1,000,000. This new company also takes over the property of the Cuyahoga Steel & Wire Co., and the two plants will hereafter be operated from the headquarters of the company at Cuyahoga Falls, O. The Hartman Mfg. Co. was placed in the hands of a receiver several months ago. It was found that the liabilities far exceeded the assets and for a considerable period the plant was closed. Just before the appointment of the receiver the Hartman Co. purchased an interest in the Cuyahoga Steel & Wire Co. with a view of combining the two plants. The new company will be directed by the management of the Cuyahoga Falls concern, which has been highly successful.

Northern Engineering Works, Detroit, Mich., have been awarded the contract for a special double hoist, 15-ton electric traveling crane, for handling billets for the Republic Iron & Steel Co.'s Youngstown plant.

THE RELATIONS OF EMPLOYER AND EMPLOYED.*

BY EDWARD B. GILMOUR, MILWAUKEE, WIS.

"Masters give unto your servants that which is just and equal." "Servants obey in all things your masters according to the flesh not with eyeservice as men-pleasers, but in singleness of heart."

According to this authority it will be seen that the interests of employer and employed are co-equal. Although it has been often asserted that the rights of the employer and the employed are in direct antagonism, and from the nature of things this must often appear so, it does not follow that they must be hostile, as each individual has to earn his living and a living for his family whether he be an employer or be employed. The employe desires to sell his labor in the highest market, and the employer wishes to buy his labor in the lowest market. It is simply each individual trying to secure the best bargain. Yet withal their interests are to a certain extent mutual, as the employer's success depends upon the capability and physical condition of his workmen, and the workman depends upon the success and financial condition of his employer so as to sell his labor and secure a living.

The question arises, what are "wages"? The answer is very simple and must be settled upon the principles of equity, as the employer who takes labor from any one without just recompense is guilty of theft, and similarly a laborer who takes wages from any individual, a company, or a State, without giving value received, is guilty of the same crime. This is a natural conclusion and cannot be otherwise, for if there were no correct system of wages there would be no impetus for work. If the State owed us our living and gave it to us we would be encouraged to indolence. But the State does not owe any one his living. It simply owes to him the conditions under which he can earn his living, and no individual has the right to get his living from any one except through his physical or mental labors. Now with these conditions existing, two classes are naturally evolved, viz.: employers and employed. As the interests of each party are co-equal, it would seem necessary that an agreement be reached wherein both parties may get along in harmony and not infringe upon each other's rights. This agreement can best be reached by the organization of both employers and employed, but not with the object of compelling either party to submit to any arbitrary demands and leading to lockouts or strikes, which are productive only of injury to all concerned and are a menace to social order and good government.

The first trade union was formed in England about the middle of the eighteenth century. It was then formed as a necessity on account of the alarming degradation existing among the working classes, the object of trades unions being to improve and protect the interests of the workmen and in particular to raise the rate of wages. Some political economists have maintained that this is impossible, as only a certain amount of capital is laid aside to be paid in wages. If labor is plentiful the divisor will be all the larger and consequently the individual laborer will receive the less. If labor is scarce the divisor will be smaller, which will give him all the more. This is a mistaken idea, as labor is paid from what is produced and capital advances to labor its share knowing that it will be returned when the product is sold. Labor is simply a commodity which is bought and sold, but with this difference, that the seller of a manufactured commodity can withhold the sale of the article if the price is too low; but when the laborer puts his labor upon the market he must sell it, as it is the only means whereby he can live. He as an individual offering his labor for sale is compelled to take just what the market may offer, and consequently there may be reductions of wages which will bring cut-throat competition and general demoralization to employer and employed.

Trades unions in the past have been in a great many cases very arbitrary. They have tried to compel employers to submit to very unreasonable demands and have generally suffered therefor themselves. The true and only method whereby the trades union can raise wages is to increase the amount and efficiency of the product.

Restriction of the amount of work is wrong morally and is in opposition to the advancement of the country and the law of the "survival of the fittest." I believe that a workman should receive all that he earns and no more. If only a proper system of piece work could be arranged, then when a good mechanic produced a piece of work he would receive a stated price. Unfortunately some employers will continually reduce prices irrespective of the profits which they are receiving and consequently workmen are compelled to band together in order to protect themselves. Hence comes the tendency of trades unions going to excess in their demands and in the restrictions which they have unwisely put upon production.

Adam Smith says that "the source of wealth is labor." "The amount of labor of every nation is the fund which originally supplies it with all the necessaries and conveniences of life which it annually consumes." With this knowledge in mind it would be well for the employer and his workmen to co-operate and bring forth a higher class of labor with more enthusiasm greater economies, and higher productive power, every man in a spirit of emulation doing his best. Therefore let every American employer and his workmen remember that their interests are co-equal, and with the freedom which is granted in this great country there should be no limit to the amount of good which can be produced in the elevation of both parties morally and physically.

* Prepared for the American Foundrymen's Association.

Some Good Work in Grinding.

The heavy grinders built by the Norton Grinding Co., of Worcester, Mass., are evidently capable of making some of the shop records for sizing cylindrical work entirely out of date, according to figures furnished by the company. It will be remembered that these grinders are unusually heavy and substantial machines—8,000 and 11,000 pounds each—and their solid construction allows a vigorous use of the abrading appliances altogether foreign to the ordinary conception of machine shop grinding. The average mechanic would probably not allow over 3-1000ths for grinding and would use a fine feed in finishing the surface in the lathe in readiness for the grinder.

One of the examples submitted by the Norton Grinding Co. relates to the work done on a lathe spindle, a piece of machine work with which the shopman will be reasonably familiar so that he can form a fair estimate of the time required ordinarily for finishing such surfaces. The lathe spindle was of crucible steel, 60 points carbon, and had an overall length of 49 15-16 inches. The diameter of the largest bearing was 5 inches and the roughing out taken in the lathe was at the rate of a 6-per-inch feed. The finishing cut was taken in a Norton plain grinding machine with the following results: Average amount of stock removed by grinding, .04 inch; limit of error, .0005 inch; time of grinding complete, 1 hour and 45 minutes. This example was taken from every-day practice, and is the average time required to grind a spindle of the above dimensions. Owing to the peculiarity of fit and finish the manufacturer had been taking about 14 hours for the finish cut and filing in the lathe. Another instance is the case of a flywheel shaft. This was 8 feet long with the two ends of the shaft 8 inches in diameter and a short section, midway between the ends, 9 inches in diameter. The shaft was turned at one rough cut about 1-32 inch above the finished size and was then ground in the Norton plain grinding machine to size in 2½ hours. It formerly required in the lathe, 8¾ hours to take the finish cut and file. The lathe time given above is not according to old or antiquated methods, but is the time allowed in a well equipped and up-to-date shop.

A new scale will be signed on Aug. 1 with the employes of the mills of the Illinois Steel Co., formerly associated with the Amalgamated Association of Iron and Steel Workers. The officials of the company have asked that a few slight changes be made in the existing scale, but there will be no change in the general basis. Now that the Amalgamated Association refused to recognize the men in the plants of the Illinois Steel Co. negotiations in the future will be carried on without the aid of the Amalgamated Association officials.

The Glazier Stove Co., Chelsea, Mich., will erect a brass foundry in connection with its plant. It will contain six furnaces.

ELECTRICALLY OPERATED AIR COMPRESSORS.

Pneumatic tools and other appliances for the utilization of compressed air have been introduced into one field after another with such successful and gratifying results that the advantages of using compressed air for a wide variety of purposes are now fully recognized. The present general use of electricity renders it advantageous to operate air compressors with electric motors, for an electrically driven compressor can be operated from any lighting, power or railway circuit that may be available.

To meet the demand for an electrically driven, simple, compact air compressing unit, the Christensen Engineering Co., of Milwaukee, is manufacturing a complete line of motor-driven compressors ranging in capacity from 7½ to 1,000 cubic feet of free air per minute. The smaller sizes are made for portable as well as stationary service.

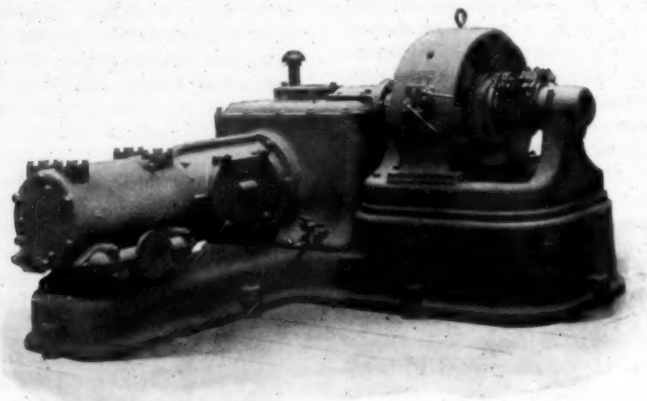


FIG. 1.—CHRISTENSEN TYPE "M" MOTOR DRIVEN AIR COMPRESSOR.

The type "M" motor-driven air compressor illustrated in Fig. 1 is for stationary continuous service. It is built in capacities from 50 to 1,000 cubic feet of free air per minute. The electric motor and the compressor have been designed to form a compact self contained unit. The air is compressed in the cylinder, shown on the left, by a double acting piston which is operated by means of a connecting rod and steel crank shaft. The latter is mounted in bearings located within the frame of the machine. This shaft carries on the motor end a helical gear which is driven by a pinion on the armature shaft of the motor. The entire machine is mounted on a substantial cast iron base. Both the cylinder and the valve heads are water jacketed throughout. The clearance spaces have been reduced to the lowest practicable limit, thereby correspondingly increasing the economy. The suction and discharge valves are arranged in cast iron heads bolted directly to the cylinder. They consist of seamless cold drawn steel cups, so arranged that each is removable independent of the other. No springs are used with these valves. They are operated by the compressed air itself and are reseated by gravity. The peculiar construction of these valves renders a small lift possible, hence the noise from their operation is reduced to a minimum. The suction and discharge valves are identical and interchangeable. Only one connection is necessary when piping from the compressing cylinder to the reservoir.

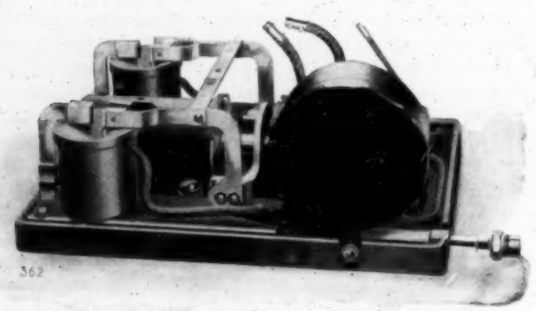


FIG. 2.—AUTOMATIC GOVERNOR FOR TYPE "M" COMPRESSORS.

The piston is provided with an improved form of packing rings which are carefully fitted in place so that they form as near a perfect sliding joint as can be obtained. The piston rod is of steel, carefully ground true on dead centers. The rod passes through a self adjusting metallic packing box. The connecting rod is made of steel and is arranged to receive oil for lubricating the crank pin, wrist pin and piston. The crosshead is provided with adjustable shoes of extra large area and with an accurately ground hardened tool steel wrist pin which fits into a phosphor-bronze bearing in the rod. The crank shaft is composed of a high grade steel, and is provided with extra large bearings, thus avoiding the frequent adjustment of the bearing boxes which is usually necessary with bearings of ordinary size. The shaft is carefully balanced and accurately turned true to receive the connecting rod. The crank shaft is extended at the motor end to carry the gear which is driven by a pinion on the armature shaft of the motor. The gear and pinion are of the helical herringbone type with teeth cut by special machinery in the most perfect manner, thereby reducing the noise so that it is almost unnoticeable.

The gear case and the crank chamber are connected and form an enclosure which is partly filled with oil, with which all the working parts are automatically lubricated, including the air cylinder. The latter is connected with the oil chamber so that the proper quantity of oil for lubricating the surface between the cylinder and the piston is automatically supplied and no sight feed lubricator is required. The motion of the crank shaft in the oil causes continuous lubrication of the main bearings, the crank pin bearing of the connecting rod, the crosshead guide, the piston rod, the wrist pin in the crosshead and the piston. Oil is also supplied automatically to the bearings at the pinion end of the motor. The gear and pinion operate continuously in the oil bath. The machine will remain lubricated as long as the oil is kept up to a level determined by a filling plug on the side of the crank chamber. Experience has shown that, after being supplied with oil, the compressor runs for several weeks before replenishing is necessary.

FIG. 3.—CHRISTENSEN TYPE "L" MOTOR-DRIVEN AIR COMPRESSOR.

Either an alternating or a continuous current motor may be used. The illustrations herewith show the continuous current multipolar type that the Christensen company builds for this service. The lower frame of the motor is of cast iron and the field is composed of low carbon cast steel with detachable

steel pole pieces. The motors are series wound and are started and stopped without using resistance of any kind. The armature is of the latest ventilated type, built up of discs of soft steel and slotted to receive the winding. Machine formed armature coils are used; the insulation and other materials are of the highest grade obtainable. The communtator is built up of hard drawn bars of the best lake copper insulated from each other by segments of mica. The armature shaft revolves in extra long bronze bearings with ring oiling arrangement. The bearings are so designed that it is impossible for oil to get into the armature. The brush holder is of the simplest possible construction. It is provided with an instantaneous tension adjuster arranged so that the tension can be increased while the motor is running.

The design of the motor and compressor is such that every part is easily and quickly accessible. By unscrewing a few bolts the armature and the field coils can be removed or exchanged. The gear, pinion, valves or cylinder heads may also be removed without disturbing any other parts. Access to the crosshead and wrist pin is obtained by doors conveniently arranged on the side of the slide frame. The crank chamber is constructed so that it is completely closed but the upper part may be quickly removed giving free access to all the working parts while a smaller hand hole covering is provided and may be easily removed for inspection of the interior.

An automatic governor, Fig. 2, starts and stops the motor compressor at the desired minimum and maximum pressures. It consists of an ordinary pressure gauge mechanism with a special hand which upon coming in contact with a conducting stud at the position of minimum pressure, allows current to flow through a magnet coil. This coil operates a plunger to

FIG. 4.—CHRISTENSEN TYPE "I" PORTABLE AIR COMPRESSOR.

which the contact pieces for the motor circuit are attached thereby closing the circuit and starting the motor. As soon as the pressure reaches the desired maximum the hand strikes another stud and the current passes through a second solenoid magnet thereby pulling the plunger in the opposite direction and opening the motor circuit. By this mechanism it is possible to get a close margin between maximum and minimum pressures. This margin is readily adjusted by moving the contact studs. The governor is provided with a magnetic blow-out for extinguishing the arc and preventing the burning of the contact pieces. All the working parts are easily accessible for inspection and the governor is protected by a cover not shown in the illustration.

A smaller compressor for stationary continuous service is built in capacities from 4 to 35 cubic feet of free air per minute. These are known as type "L" and they are similar in design and construction to type "M," described above. The motor is mounted directly over the compressor instead of on the side. The compressor has two cylinders which are water jacketed throughout. Each cylinder is provided with a single acting plunger piston which is operated by a connecting rod from a well balanced steel crank shaft. The shaft is extended at one end to carry a helical gear which is driven by a pinion on the armature shaft of the motor directly above. The base of the motor forms a cover for the compressor frame and the gears are also enclosed in a suitable casing. The interior of the compressor is therefore completely enclosed and protected from injury. This compressor is a modification of the type "H"; the water jacketing feature being added to make it suitable for continuous service. (The type "H" is the Christensen motor-driven compressor so well known in the electric railway field. More than five thousand of them are in daily and highly satisfactory use in connection with the Christensen air-brake equipments on electric cars throughout the world.) The suction and discharge valves are of seamless cold drawn steel. They are conveniently arranged in the cylinder back cover so that each is independent of the other and separately accessible.

The illustration of the type "L," Fig. 3, show the continuous current type that the Christensen Co. has made for several years for use with its air-brake equipments on electric cars. They are four pole series wound motors with two field coils. They have cast steel frames and cast steel poles. All the other important features of the motor are similar to those used with the type "M" compressors.

For portable service the Christensen Co. mounts the type "H" compressor with the automatic governor and air reservoir, on a suitable hand truck which can be easily and quickly moved wherever necessary. The probable outfit, known as type "I," Fig. 4, has a wide field of usefulness wherever pneumatic tools or other compressed air appliances are used and an expensive system of piping is not desirable. The compressor is taken to the work instead of transmitting the compressed air from a stationary compressor at a distance. These compressors are frequently mounted on a wagon instead of a hand truck and transported by horses for use in drilling and bonding rails, etc., in electric railway or other work where electric power can be obtained. It is only necessary to make a connection to the trolley wire by a hook or pole for the purpose of obtaining power for the motor. It is also practicable to make the smaller sizes of the type "M" portable; especially where the truck, upon which the compressor is mounted, is arranged to run on rails.

Tidewater Steel Company.

The Tidewater Steel Co. voted last week to increase the capital stock by an issue of $600,000 worth of preferred stock. President Charles E. Stafford made an exhaustive report upon the condition of the plant dating from his connection with the company, in July, 1901. The improvements made and contemplated were explained in detail and the plant was stated to be in better physical condition than ever, the books being filled with contracts for plates for a long period ahead. President Stafford further said: "We began making money last September and have been making money ever since that time. We have run as high as $20,000 per month, but our profits have been absorbed in necessary changes and in additions to the plant which will add greatly to its effectiveness and earning capacity in the future. The year 1901 shows gratifying increases. Pig iron shipments have increased over 250 percent, plate shipments over 120 percent, plate scrap shipments over 120 percent, and open-hearth steel production over 275 percent." In conclusion, the president said: "We have now passed through the formative stage; our working organization is good. We will be able to turn out a much larger production when the additional open-hearth furnaces to make the ingots required for our finished material have been completed. The issue of preferred stock will enable us to supply ingots for the large plate mill and put the blooming mill in condition to roll slabs for the smaller plate mill and the production of our blast furnace will be nearly double. The arrangements are about completed for the erection of by-product coke ovens, which will mean a saving to the company of $75,000 per year, or more than enough to pay interest on the new preferred stock. The contemplated improvements will make your company one of the strongest plants of its kind in the East."

The following board of directors was elected: Evans R. Dick, George S. Graham, George McCall, Charles A. Porter, R. H. Rushton, Charles T. Schoen, A. S. L. Shields, C. E. Stafford and F. W. Wood. The company's offices will be moved from Philadelphia to Chester.

Ten of the thirty mills of the Shenango plant of the American Tin Plate Co. resumed operations this week after being shut down owing to a partial wrecking of the plant. As soon as the remainder of the plant can be repaired the remaining twenty mills will be placed in operation.

A 325-TON HOT METAL MIXER.

In the *Engineering News*, Arthur C. Johnston describes with some detail and with the aid of the accompanying illustrations the metal mixers employed in modern steel works in connection with the use of direct metal. The article is as follows:

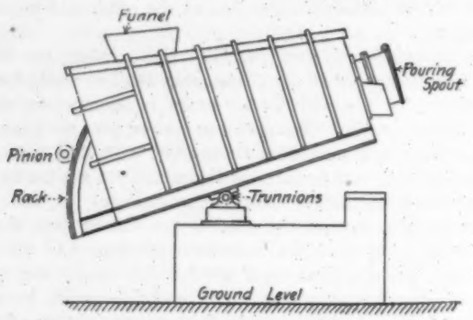


FIG 1.—ORIGINAL HOT METAL MIXER AT EDGAR THOMSON STEEL WORKS. CAPACITY, 100 TONS.

Hot metal mixers are used in connection with steel works which are so situated that the iron from the blast furnaces can be converted into steel "direct," that is, without casting and remelting. The mixer serves the purpose of a storage tank from which the supply of hot metal for the converters is drawn, and also insures a much more uniform grade of iron, since several casts are mixed together and their inequalities neutralized. In order to secure a continuous supply of hot metal sufficiently uniform in regard to its different chemical constituents, the storage tank should have a capacity of at least four blast furnace casts, so that for stacks of the 500-ton class, making six casts of 80 tons per day, the mixer should have a capacity of 320 tons. The design of a vessel capable of holding continuously this amount of molten iron has many interesting features.

The first mixer had a capacity of 100 tons, and was built at the Edgar Thomson works of the Carnegie Steel Co. in 1888. This experiment proved so successful that many tanks of larger capacity have since been built, and the design of mixers has been more fully developed. In Fig. 1 is shown the general outline of the original Edgar Thomson mixer. This vessel had flat sides and bottom, and was heavily braced by beams and buckstays to resist the internal pressure. It was mounted on trunnions, and was tipped for pouring by means of a segmental rack and pinion.

In Fig. 2 are shown the chief features of a very successful design of vessel of 325 tons capacity. The bottom of this tank is circular, and it is mounted on two sets of rollers, which conform to the shape of the cast steel tracks which are secured to the bottom of the tank. As the center of the arc formed by these tracks and the center of the mixer coincide, the vessel is virtually pivoted about this point when being tipped, while the total load is distributed over all the rollers instead of being concentrated on trunnions, as in the case of the Edgar Thomson mixer.

The sides and bottom of the vessel are formed of steel plates 1 inch thick, securely riveted together. The sides are tied at the top by means of the 10-inch I-beams in the roof, and they are secured at the bottom by 6x6x7/8-inch angles in the corner. The bottom is stiffened by 12-inch I-beams, but no stiffeners are required on the sides, as they are swelled to the radius shown. The pouring spout, with its eccentric load of hot metal, is balanced by cast iron counterweights placed at the opposite end of the mixer. The bottom and sides have a firebrick lining 18 inches thick and the roof 14 inches thick. It will be observed that the roof is arched in both directions. This is a very important point, as in several of the large mixers a great deal of trouble has been caused by bricks dropping out of the roof when the arch was carried over in one direction only, as the action of the intense heat is very racking. On this account the work of lining the vessel must be very carefully done, as it will be readily understood that the results of even a small leak would be disastrous. The thrust from the top arch is taken up by the tie rods which pass just beneath the 10-inch I-beams to which they are attached, and these beams also carry the vertical component of the stress in the rods.

The arch over the pouring spout has sufficient rise to prevent the lining at this point from being submerged in the hot metal when pouring, and as this arch also carries part of the thrust from the longitudinal arch of the roof, it is backed up by an arched steel casting, to which the tension rods of the

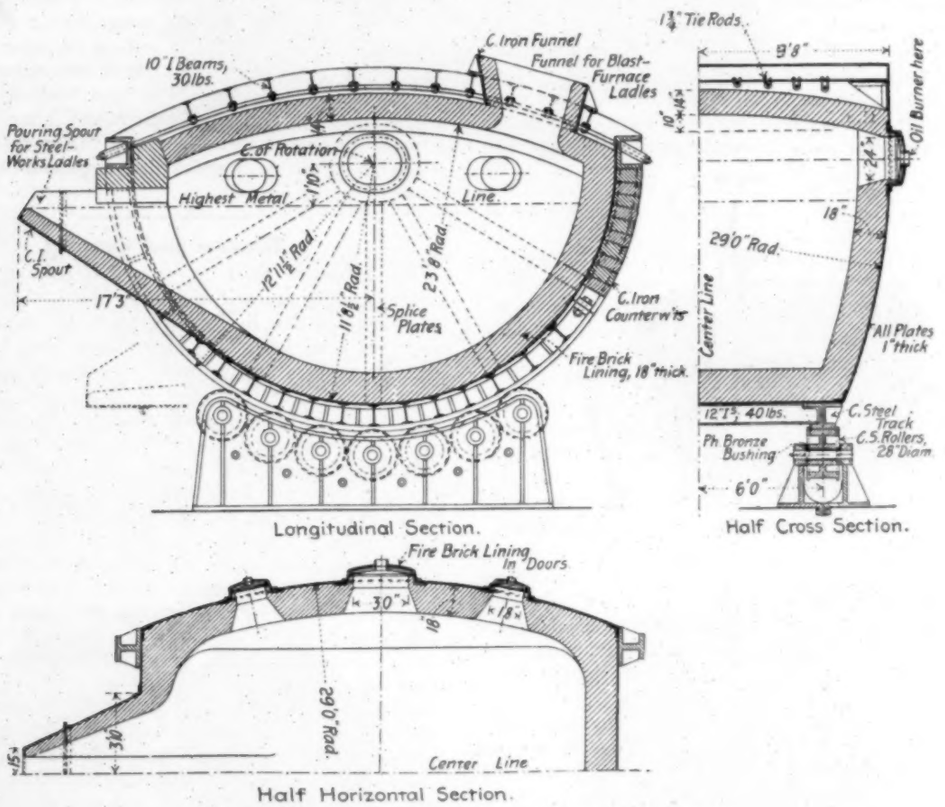


FIG. 2.—DESIGN FOR HOT METAL MIXER OF 325 TONS CAPACITY.

roof are secured. It will be observed that the pouring spout is almost as wide as the vessel at the point of its junction with the latter. It is made so in order to allow the scum which floats on top of the molten metal to be easily drawn off into the steel works ladle; otherwise, it is a very difficult matter to get rid of this accumulation. With the wide spout, however, this is very easily accomplished, as in case the scum does not run out freely with the flowing metal, the attendant can easily draw it off with a long rod, since all corners are accessible. The hot metal from the blast furnace ladles is poured into the tank through a funnel-shaped mouth placed at the end of the mixer opposite to the pouring spout, and this mouth is well lined with firebrick to protect it from the splashing which cannot be avoided in emptying the ladles. It will be observed that the funnel and the end of the pouring spout are made of cast iron. These are the parts that are most liable to be destroyed by contact with the molten metal, and by having a pattern for these on hand spare castings can be obtained from time to time to replace those damaged.

The heat necessary to preserve the temperature of the hot metal is supplied by three fuel oil burners, one of which is inserted into the pouring spout and into each of the circular openings at the center of rotation of the vessel. These burners have universal joint connections to the steam and oil supply pipes, so that they can be withdrawn when not in use. The vessel is tipped for pouring by means of two single-acting hydraulic cylinders operating on a common plunger, to the crosshead of which a connection is made by a rod to the bottom of the mixer.

PERSONAL.

James B. Brady, general sales agent, and R. L. Gordon, formerly chief engineer of the New York offices of the Pressed Steel Car Co., have accepted similar positions with the Standard Steel Car Co., of Pittsburg.

Joseph A. McDonald, formerly superintendent of the converting and rolling mills of the Ohio plant of the National Steel Co., Youngstown, O., has been appointed assistant superintendent of the entire plant. This position has just been created at this plant.

E. J. Thomas, Jr., has been appointed auditor of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., to succeed Charles H. Schoolar who resigned on May 1.

On Wednesday evening, May 14, a banquet was given at Youngstown, O., to the heads of departments of the Republic Iron & Steel Co. in the Youngstown district.

Joseph Rayser, formerly of the Haselton Furnace of the Republic Iron & Steel Co., Haselton, O., has been appointed assistant superintendent of the Mary stack of the Ohio Iron & Steel Co., at Lowellville, O.

At the meeting of the Iron and Steel Institute, at London, Eng., held last week the institute awarded the Carnegie gold medal to Dr. J. L. Mathews, of New York.

George M. Summers, who on May 1 retired from the superintendency of the Brown-Bonnell plants of the Republic Iron & Steel Co., at Youngstown, O., to accept a similar position at the Valley plant of the same company, was remembered by his former associates and employes with a magnificent watch, chain and charm.

Louis McDonald, formerly connected with the Carnegie Steel Co., has been appointed superintendent of the converting department of the Ohio plant of the National Steel Co. at Youngstown, O.

Wm. W. Hearne, of Matthew Addy & Co., Cincinnati, has sailed for Europe.

George W. Cope, associate editor of the *Iron Age*, who has represented that paper with such marked ability as the head of its Western editorial office, will be connected hereafter with the main editorial office at New York. W. T. Partridge, heretofore of the New York office, succeeds Mr. Cope at Chicago.

Edward C. De Wolfe, late in charge of the draughting room of the Dodge Mfg. Co., of Mishawaka, Ind., and a frequent contributor to the columns of mechanical journals, has accepted the position of associate editor of *Steam Engineering*, which has lately removed from New York to Chicago. He takes up his new duties at once.

TRADE PUBLICATIONS.

Three neat pamphlets show the various forms of ball manufacture which issue from the ball and pedal factory of the Automobile & Cycle Parts Co., of Cleveland. These balls are made in brass, bell metal, German silver, aluminum, tool steel, Bessemer steel, malleable iron and cast iron, and whilst it is customary for all ball manufacturers to lay great stress upon the accuracy of their finished product, the company considers this matter of accuracy as really secondary to hardening and the uniformity of material, for without these two conditions even wear is impossible. The factory has a capacity of half a million balls daily and the several pamphlets give some highly interesting data, particularly in regard to high duty tool steel balls.

The J. M. Carpenter Tap & Die Co., of Pawtucket, R. I., has sent us catalogue No. 14, treating of tools for cutting threads. This covers 118, 3¾x6-inch pages and is bound with a comprehensive index. Taps and dies are the leading features of the publication, but considerable space is allotted to drill lists, tap wrenches, pipe reamers, stocks, etc.

Several circulars and a pamphlet are devoted to the American attrition mills, crushers, pulverizers, gas and gasoline engines manufactured by the American Engineering Co., of Springfield, O. The pulverizers, steel cake breakers and attrition mills are used in crushing and grinding cotton seed and linseed cake, white lead, litharge, barytes, etc., and a very finely illustrated account is given of the construction of this machinery. The "American" engines are of the well known 4-cycle type and of rugged appearance.

The A. Leschen & Sons Rope Co., of St. Louis, Mo., has prepared catalogue No. 23, extending to some 80 pages of compactly arranged text and illustrations. The publication is printed in colors with an embossed cover. Some timely remarks, in these days of improved transmission facilities, are submitted on the use and care of wire ropes, suggestions in regard to speed and wear and their relationship, etc.

The Hunter Arms Co., of Fulton, N. Y., has an elegantly printed catalogue of the L. C. Smith guns. The work is adorned with an excellent half-tone of the Hunter Bros.

Bulletin No. 1023, of the Fort Wayne Electric Works, of Fort Wayne, Ind., contains a description of the multiple system of alternating current enclosed arc lighting for street service.

Two New Furnaces at Buffalo.

William A. Rogers, of Rogers, Brown & Co., and F. H. and C. W. Goodyear are proposing to build in Buffalo two large modern blast furnaces for the manufacture of foundry pig iron. An option has been secured on about fifty acres of land in the vicinity of the Stony Point steel plant of the Lackawanna Iron & Steel Co., which will no doubt be chosen as the site. It is expected that each furnace will produce about 400 tons of pig iron a day. The company intends to make a specialty of malleable and strong machinery pig iron. The officers as so far arranged are: W. A. Rogers, president; F. H. Goodyear, first vice president; C. W. Goodyear, second vice president. The ownership is equally divided between the Goodyear firm and Mr. Rogers. It is expected that work will be begun during the summer and completed within the following eighteen months or two years. The company will have its own ore properties in the Lake Superior region and coal mines of coking coal in Pennsylvania. The capital to be employed in the furnace plant, ore mines and coal operations is $3,000,000.

A Japanese correspondent writing to *The Iron Trade Review* from Tokyo, refers to the depression that has checked importation in the past two years, and that still operates to repress industrial development there. The government steel works, recently established with an outlay of $10,000,000, for the manufacture of plates, rails and other finished forms, is not yet successful, though in operation. Pig iron is imported for the most part from England and China. No good coke is manufactured in Japan, but importations are made at reasonable cost from England and Canada. Foundry operations are conducted on a small scale, but as the financial situation works easier this and other industries are likely to be developed farther.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of their Wants:—

The Chicago Pulley & Shafting Co., Chicago, has been incorporated with a capital stock of $30,000, to manufacture power and transmitting machinery. The incorporators are Albert D. Dorman, J. J. Ellis and Joseph L. McNab.

National Marble Co., Murphy, N. C., is in the market for channeling machines, steam drills, hoisting engines, boilers, derrick irons, wire cable, crushing machinery, elevators and apparatus for burning waste marble into lime.

J. E. Bell, Carthage, Mo., will probably need some machinery for machine shop and foundry.

Stephens & Tyler, Monadnock Block, Chicago, want to purchase 500 to 600-h. p. cross-compound Corliss engine.

Chesapeake Construction Co., Norfolk, Va., was recently organized to do a general machinery, electrical contracting and supply business.

Dowman-Dozier Mfg. Co., Atlanta, Ga., has been organized with a capital stock of $20,000 for the manufacture of tin, galvanized iron, hot air furnaces, etc. The incorporators are George Dowman and Graham P. Dozier.

John F. Riley, Charleston, N. C., wants to purchase a 30 to 40-h. p. return tubular boiler, and 25 to 30-h. p. engine, second hand, all complete with fixtures.

Streeter, Roberts & Norton have opened a machine and general repair shop in Utica, N. Y.

The Foster Machine Co., of Chicago, has been incorporated, capital, $4,000. The incorporators are: C. S. Woolfolk and Peter Deichman.

The Republic Railway Appliance Co., of Chicago, has received a charter of incorporation, capital, $100,000, and will manufacture railroad cars, locomotives, etc. The incorporators are: T. F. Sheridan, Annie C. Courtenay and J. E. Rupp.

Merrill Bros., 465 Kent Ave., Brooklyn, N. Y., are in the market for a second hand shear capable of cutting 4-inch billets cold.

The organization of the Alabama Frog & Switch Co., of Anniston, Ala., has been completed and capital stock, $50,000, paid in. The following officers were elected: President, Morton K. Moore, of Birmingham; secretary and treasurer, M. B. Welborn, of Anniston; general manager, T. E. Kilby, of Anniston; directors, M. W. Moore, M. B. Welborn, T. E. Kilby, Whit Chark and J. J. Willett. The concern will build a large plant and fit it out with improved machinery.

The Pearson Machine Co., of Chicago, has increased its capital stock from $50,000 to $100,000.

The Sterling Steel Foundry Co., of Pittsburg, has obtained a charter of incorporation; capital, $10,000.

The Astoria Brass Co., of Astoria, L. I., has been incorporated; capital stock, $50,000. The directors are: George J. Warmbold and Gustav Schroeder, both of Hoboken, N. J.; and Bernhard Schroeder, of Fordham, N. Y.

The Western Steel Car & Foundry Co. has been granted a New Jersey charter with a capital of $1,250,000 for the purpose of taking over the plant of the Illinois Car & Equipment Co., at Hegewisch, Ill. The Pressed Steel Car Co., of Pittsburg, will hold $1,000,000 worth of the stock, while the McCord Co., of Chicago, will hold $250,000. The Western Steel Car & Foundry Co. has a lease on the Hegewisch plant for a period of 10 years at a rental of $60,000 per year with the privilege of purchasing at the expiration of this period for $1,200,000. The new company will take charge of the plant immediately and will erect a foundry at a cost of $200,000 for the casting of steel car frames. It is probable that A. E. McCord will remain in charge of the Hegewisch plant.

The Spargo Wire Works Co. and the Empire Insulated Wire Works, Rome, N. Y., have consolidated under the name of the Empire Wire Co.

The Belleville Foundry Co., Belleville, Ill., has been incorporated with $15,000 capital and will operate a gray iron foundry, plans for which are now under preparation. W. H. Wangelin, I. H. Wangelin, and R. W. Ropiquet are the incorporators.

The Superior Chain Co., of Marysville, Pa., has been incorporated with $25,000 capital. Logan A. Marshall of York, Pa., is president.

The Avalanche Mill Co., Indianapolis Ind., has been incorporated with $15,000 capital and will operate a plant for the manufacture of mining machinery and all kinds of power accessories for milling. The new plant will be built at Indianapolis. A. A. McKain, A. R. Nicholas, R. B. Hilleary, C. E. Sloan and Chester Bradford are the incorporators.

The Canton Foundry & Machine Co., Canton, O., has increased its capital stock from $25,000 to $100,000.

The Excelsior Tool & Machine Co., of East St. Louis, Mo., has been incorporated with $75,000 capital to manufacture machinery and castings. T. F. Phylippi, M. B. Nolan and E. M. McDonnell are the incorporators.

The American Soil Pipe & Foundry Co., of Birmingham, Ala., has been incorporated with $100,000 capital to operate a foundry for the casting of soil pipe, hydrants, etc. W. J. Long, T. Y. Huffman and H. C. Mead are the incorporators.

The Northwestern Metal Co., of Milwaukee, has been incorporated with $2,500 capital. Peter Cassel, John P. Cassel, Jr., and John B. Wendel are the incorporators.

The Central City Foundry Co., of Central City, W. Va., has been incorporated with $10,000 capital. M. J. Deord, E. Hornbrook, John Hornbrook, M. H. Eversole and George Eversole are the incorporators.

The American Concrete Steel Co. has been incorporated in New Jersey with $100,000 capital. John T. Simpson, J. L. Hay and G. W. W. Porter are the incorporators.

The Roach, Von Wycke Machine Tool Co., of Cincinnati, is in the market for a 15-h. p. engine and boiler complete.

Alvey-Ferguson Co., Louisville, Ky., is in the market for an automatic lathe for turning rollers from 17 to 40 inches long, and from 2 to 3½ inches in diameter.

The South Bend Watch Co., South Bend, Ind., was organized in Chicago last week with a capital stock of $1,000,000. Those interested in it are Clement Studebaker, Jr., William P. Williams, Howard H. Gross. The company has purchased the plant of the New Columbus Watch Co., Columbus, O., which will be greatly enlarged. The officers are as follows: Clement Studebaker, Jr., president; Irving A. Sibley, treasurer, and E. A. Bazzett, manager.

The Huber Mfg. Co., of Marion, O., will buy a first class second hand combined punch and shear. It should be strong enough to punch a hole in 1¼-inch soft steel plate and the shear should be heavy enough to shear 2-inch square steel bars.

The Niles Iron & Sheet Co., Niles, O., is in the market for a second hand building, about 120x150 to 200 feet; also for a boiler 250 to 500-h. p.

The Walsh & Weidner Boiler Co. has been incorporated at Nashville, Tenn., with $15,000 capital to operate a boiler plant. A. H. Chapman, Frank Jenkins, M. Llewellyn and G. D. Lancaster are the incorporators.

Fires and Accidents:—

The machine shop and foundry of the Medart Patent Pulley Co., St. Louis, Mo., were destroyed by fire May 4. Loss $300,000.

Fire destroyed part of the plant of the Iowa Iron Works, Dubuque, Ia., May 8, doing damage to the extent of $25,000. The fire originated in the foundry, which was entirely destroyed.

On May 1, for the second time in a few weeks, the plant of the Bettendorf Axle Co., Davenport, Ia., was seriously damaged by fire. The exact loss has not been determined, but it is estimated to be upward of $100,000. Soon after the first blaze, the company decided to remove its axle plant to Gilbert, a suburb of Davenport, and devote the old factory, which was in process of reconstruction, to the manufacture of farm wagons. This plant having been entirely destroyed, the company is now seriously contemplating removing the entire works to Gilbert.

New Construction:—

The Roach, Von Wycke Machine Tool Co., of Cincinnati, will erect a one-story brick building, 50x100 feet, at the corner of Elinore St. and the C. H. & D. railroad in that city. The structure is expected to be finished and ready for occupancy

about July 1. The firm will for the present continue to make a specialty of 15-inch lathes. The new building was made necessary by reason of the company being unable to handle the rush of business, being sold up for seven months ahead according to the present plant capacity. Mr. Roach was formerly superintendent of milling machines with the R. K. LeBlond Machine Tool Co

The Lamb Knitting Machine Co., of Chicopee Falls, Mass., will begin work on a new plant as soon as material can be obtained. Contract has been awarded to D. G. Canty for a building 40x120 feet, three stories high, and Aug. 1 is the date set for completion.

The Beall Shovel Co., of Alton, Ill., has secured a part of Market St. as a site for an addition to the plant.

George P. Valby, of Albert Lea, Minn., will build a 25x60 feet addition to his machine shop.

The Price & Evans Mfg. Co., of Chattanooga, Tenn., has completed a large addition to the foundry and put in a 10-ton traveling crane. The company has also purchased the architectural iron and jobbing business of the Cahill Iron Works and are making other improvements in the line of business extension.

The Wilson Stove Mfg. Co., of St. Louis, Mo., has purchased the property on the corner of Cass Ave. and Second St., 152x88.6 feet, for the sum of $12,000. Extensive improvements are planned.

The new Wilkes foundry building on Woodville St., Toledo, O., will be under roof this week and the plant will be in full operation about the middle of June.

The Michaelman Boiler Co., of Quincy, Ill., has purchased two more lots adjoining its plant at Second and Hampshire Sts., and will enlarge the works.

Work at the new foundry of the Montpelier (Ind.) Cup & Metal Works is progressing and the furnace has been placed in position. The foundation for another building has been completed and the erection of the structure will commence at once.

The Sprague Foundry & Mfg. Co., Council Bluffs, Ia., will remove its plant to another location in that city. A foundry building will be erected at once.

The Western Foundry Co., Milwaukee, Wis., has had plans prepared for a $6,000 addition to its foundry.

The Alabama Frog & Switch Co., which was recently organized with a capital of $10,000, will build a plant at Anniston, Ala. Morton K. Moore, of Birmingham, president; M. W. Wellborn, Anniston, secretary and treasurer, and T. E. Kilby, Anniston, general manager.

Cane Belt Railroad has had plans prepared for the construction of its proposed machine shops at Lane City, Tex. Contracts have been awarded for the necessary buildings. W. T. Eldridge, general manager, Eagle Lake, Texas.

The Michigan Steel Boat Co., Detroit, Mich., has had plans prepared for a three-story building, 80x300 feet, to be erected on the river front.

The Davis & Ludwig Foundry Co., 240 Root St., Chicago, is enlarging its foundry floor space 80x150 feet, the contract for the building having been let. An additional cupola of the latest improved type will be erected increasing the company's present capacity 30 tons a day. A new chipping and cleaning room will also be built. The company has many orders on hand for castings to be made of its mixture of Salamander iron, as well as large orders for heavy and medium weight castings.

The Danville Foundry & Machine Co., Danville, Ill., will erect an addition to its plant, 175x80 feet. The capacity of the plant will be practically doubled by the erection of this addition.

The Wellman-Seaver-Morgan Engineering Co., Cleveland, O., is erecting an addition to its plant, 400x120 feet. The contract for the building has been awarded to the Garry Iron & Steel Co., of Cleveland.

The Putney Brake Mfg. Co., of Toledo, O., will erect an additional plant at Monroe, Mich.

The A. Leschen & Sons Rope Co., St. Louis, Mo., is preparing to erect a new factory building, 80x365 feet, two stories high. A warehouse will also be built, 75x150 feet. The two buildings will represent an expenditure of fully $80,000.

The Chicago Pneumatic Tool Co. will erect a steel storage building in connection with its Detroit, Mich., plant, which will be 200 feet long and 50 feet wide.

Charles F. Dunbar, Buffalo, N. Y., is promoting a company which will erect an immense foundry near the plant of the Lackawanna Iron & Steel Co., at Stony Point.

At a meeting of the directors of the William Cramp & Sons, Ship & Engine Building Co., Philadelphia, Pa., held last week it was decided to expend $4,000,000 in extending the yards owing to the demands for the construction of larger vessels. A large amount of new machinery will also be installed.

The West Davenport Foundry & Machine Co., Davenport, Ia., will erect an addition to its plant to be used for office and warehouse purposes. The machine shop is also to be enlarged.

The American Car & Foundry Co. will erect a brick warehouse at Detroit, 80x100 feet.

The Bettendorf Axle Co., Davenport, Ia., has already let contracts for the erection of a new building to replace the one recently destroyed by fire. The structure will be one story high and 700 feet long and 240 feet wide.

The Parkesburg Iron Co., Parkesburg, Pa., will shortly install an additional train of muck rolls together with the necessary heating furnaces, etc.

At a meeting of the stockholders of the Youngstown Mfg. Co., Youngstown, O., held last week, it was decided to erect a puddle mill and a rod mill to its present plant. The capital stock of the company was also increased from $300,000 to $500,000.

The Buffalo Foundry Co., of Buffalo, has recently decided to increase its capital stock from $10,000 to $200,000, and will immediately build one of the largest and most modern jobbing foundry plants in the country. It has secured a very desirable site of 6½ acres near Driving Park Station, on the Belt Line Railway, Buffalo, thus giving connections with the twenty-eight railway lines entering Buffalo. The plant for the present will consist of one main foundry building, 320x145 feet, of steel construction, equipped with two 30-ton and four 10-ton electric traveling cranes, six 5-ton jib cranes and six 2-ton jib cranes. There will be one 102-inch shell, one 84-inch shell and one 66-inch shell cupolas and one 15-ton air furnace together with air plant and every modern appliance for the economical production of castings from the lightest up to the heaviest. The pattern making and storage building will be 50x200 feet, three stories high; the supply building, 30x320 feet, for the storage of raw materials. It is the intention of this company to use electric motors throughout, using the Niagara Falls electric power. The plant is being so arranged that an open-hearth steel department, 145x400 feet, can be added together with what machine shops are found necessary.

The Pittsburg District:—

Spang Chalfant & Co., of Pittsburg, placed in operation last week their new lap weld pipe mill which will produce pipe from 10 to 30 inches. The recent additions to the Etna plant are now all in full operation. The mill was installed under the direction of Victor Beutner while connected with Julian Kennedy.

During the past month the following Pittsburg iron and steel concerns increased their capital stock: John Eichleay, Jr., Structural Steel Co., $1,000 to $100,000; Pittsburg Malleable Iron Co., $25,000 to $300,000; Monongahela Foundry & Forge Co., $1,000 to $50,000; Hussey-Binns Shovel Co., $1,000 to $1,250,000; Follansbee Bros. Co., $300,000 to $800,000; Superior Steel Co., $100,000 to $500,000; Harris Pump & Supply Co., $1,000 to $50,000; Burns Uniform Steel & Metallic Co., $1,000 to $200,000; James H. Baker Mfg. Co., $1,000 to $500,000.

The Seaman-Sleeth Co. is making extensive improvements. A second electric plant is being installed to develop 250 h. p. and provided with Westinghouse equipment. Two 60-ton Morgan electric traveling cranes are replacing three 80-ton jib cranes in foundry No. 2. In addition an addition is being added to this foundry 90 feet in length, making the foundry 240 feet long. In foundry No. 1 seven jib cranes are being torn out, to be replaced by two 20-ton Morgan electric cranes on runways 320 feet long.

The McClintic-Marshall Construction Co. has been awarded

the contract for the erection of the new machine and erecting shops of the Pittsburg & Lake Erie railroad at McKees Rocks, Pa. The machine shop will be 170x500 feet and will be commanded by several traveling cranes of 120 tons capacity.

James L. Hukill, president of the Pennsylvania Malleable Co., Richard J. Evans and Robert F. Hunter are the incorporators of the Hukill-Hunter Co., with $50,000 capital, which will engage in the mine and mill supply business on Wood St. and First Ave.

The Sterling Steel Foundry Co., of Pittsburg, has been incorporated for the purpose of engaging in the manufacture of steel castings for all purposes. A plant will be erected at Braddock, Pa., and the erection of the main building will be commenced immediately. H. E. Wainwright, H. E. Wainwright, Jr., S. J. Wainwright, Uriah Tinker and H. I. Fisher, all of Braddock, are named as incorporators. The main building will be 400 feet long and 120 feet wide, and the power house 60 feet square.

The Pittsburg Gage & Supply Co., Pittsburg, has been appointed direct representative of the Weller Mfg. Co., Chicago, for its line of elevating, conveying and power transmitting machinery.

The Pittsburg Filter Mfg. Co., Pittsburg, reports that it has just closed a contract with the Colorado Fuel & Iron Co., Pueblo, Col., for the largest water-softening plant west of the Mississippi River. It will be used in the rod and wire mill departments of the works to purify the water for Stirling boilers, and will be installed in conjunction with the Pittsburg feedwater heater, manufactured by Jas. Bonar & Co., of Pittsburg, and will furnish a supply of water for boilers from which 97 percent of the lime will be removed.

The Frick & Lindsay Co., dealer in manufacturing supplies, announces that it has removed to its new quarters, 109-111 Wood St., Pittsburg, which gives greater and better facilities for the handling of its trade.

General Industrial Notes:—

The American Gas Furnace Co., of Elizabeth, N. J., and of 23 John St., New York, has just secured through Charles Churchill & Co., Ltd., of London, a contract calling for twelve furnaces and six blowers, to be installed in the British Government arsenal at Woolwich.

The Fore River Ship & Engine Co., Quincy, Mass., has nearly completed its new annealing plant to replace the one destroyed by fire last winter. Its new shiphouse is also nearing completion and all four of the traveling cranes are in operation. A 75-ton gantry crane has arrived and will be in operation in about a month. The 7-masted schooner Thomas W. Lawson, will soon be launched, and work is progressing rapidly on all other ships under construction, including the battleships New Jersey and Rhode Island.

The Hazelton Boiler Co., of Rutherford, N. J., is reported to have recently secured some orders for boilers to be shipped to China.

The J. A. Fay & Egan Co., of Cincinnati, is reported to have secured an order calling for the shipment of $7,000 worth of woodworking machinery to Buenos Ayres.

The Bosworth-Holding Co., of Cleveland, has opened an office and warerooms at 26 Merwin St., where W. H. Bosworth and H. H. Holding will handle machinery, new and second hand, making a specialty of large units, engines, boilers, generators, motors, and machine tools. They represent several prominent manufacturers of the lines mentioned.

The Jackson Drop Forging Co., of Cleveland, will remove about July 15 to its new plant on Axtell St. near Aetna on the Wheeling & Lake Erie Railroad. The new building is 75x100 feet.

The Lucas Machine Tool Co., of Cleveland, will remove about Jan. 1 from the old Brush Electric Co.'s plant to Glenville, east of Cleveland, where a new brick and steel building is under construction.

Recent shipments of the David Bell Engineering Works include three 700-pound hammers to copper mining companies in Upper Michigan; two 500-pound hammers to San Francisco; a 1,700-pound slide hammer to Seattle, Wash.; one of the same size to Mackintosh, Hemphill & Co., Pittsburg; a 500-pound hammer, the fifth sold to the works of the American Tin Plate Co.; a 700-pound hammer for export to Manila, Philippine Islands; a 500-pound hammer to the Lancaster Machine & Knife Co., of New York. Orders now on hand include an 850-pound slide hammer for a large forge in New England; an 1,100-pound slide hammer for the Colonial Steel Co., Pittsburg; another 850-pound hammer for Pittsburg parties; a 500-pound hammer for export to Canada; a 250-pound hammer for Cumberland, Dugan & Co., Baltimore; and another for Prentiss Tool & Supply Co., of Pittsburg. The works at Buffalo are taxed to their utmost to keep pace with orders, even with the addition of new tools to increase the output.

At a meeting of the creditors of the Continental Iron Co., held with Referee L. F. Hunter, at Warren, O., last week, Trustee W. D. McKeefrey reported that the Wheatland, Pa., plant of the company was making money and that the debts are fast being paid. He said he had hopes that by July 1 it would be unnecessary to continue the operation of the plant under a trustee. Further improvements to the plant are to be made shortly.

The Youngstown Iron, Sheet & Tube Co., Youngstown, O., last week broke ground for the erection of its new skelp mill. Work on this plant will be hurried so that it can be placed in operation within six months.

The Sharon, Pa., plant of the Republic Iron & Steel Co. will be placed in operation immediately. The plant has been out of operation for the past four months on account of the scarcity of pig iron.

The Cleveland Furnace Co., of Cleveland, O., with $1,000,000 capital, was organized last week for the purpose of erecting and operating a blast furnace at Cleveland. Mention of the undertaking and the size of the plant have been previously made in these columns. Directors have been elected as follows: Archer Brown, New York; D. B. Meacham, Cincinnati; W. G. Park, New York, and S. W. Croxton, Cleveland. Mr. Meacham was elected president; D. T. Croxton, general manager, and C. S. Smith, secretary.

The Maryland Rail Co., Cumberland, Md., advises us that it is now in position to take orders for the delivery of 16-pound rails after June 1. Sections up to 25 pounds will also be rolled and the mills for rolling sections below 16 pounds are rapidly being installed.

At a meeting of the shareholders of the Dominion Iron & Steel Co., held at Montreal, last week, it was decided to increase the capital stock by issuing 50,000 shares of common. This will increase the capitalization to $25,000,000.

The Bass Foundry & Machine Co., Fort Wayne, Ind., last week shipped three carloads of machinery to the plant of the Lowell Fertilizer Co., Lowell, Mass. This consignment, which is the second shipped this year, consists of a 300-h. p. engine and all its appurtenances.

No. 2 furnace of the Lorain Steel Co., Lorain, O., has been blown in after an extended idleness during which extensive repairs were made.

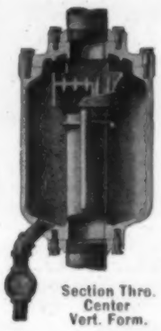
The Carnegie Furnace, recently leased by the Cranberry Iron & Coal Co., Johnson City, Tenn., has been blown in. Repairs have been made costing nearly $100,000.

The Allis-Chalmers Co., Chicago, has received a contract for two triple-expansion pumping engines from the Sanitary District of Chicago.

The Shaw Electric Crane Co., Muskegon, Mich., has received a contract from the Sharon Foundry Co., Sharon, Pa., for three 20-ton cranes, and one 5-ton crane to be installed in the latter's new foundry.

Interests closely allied with the Southern Car & Foundry Co., of Birmingham, Ala., have purchased the Coosa Furnace which is located a short distance from Gadsden, Ala. The furnace has only a small output of charcoal iron and has been idle for an extended period.

The partnership of the well known firm of Jones and Laughlins, Ltd., Pittsburg, Pa., will cease to exist on June 2 when a Pennsylvania charter will be granted and the name of the company will be changed to Jones & Laughlins Steel Co. The company is at present capitalized at $20,000,000, but the new capitalization will far exceed this amount. There will be no change in the management and the present chief stockholders are the charter applicants.



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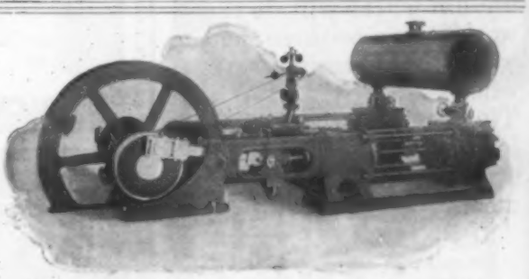

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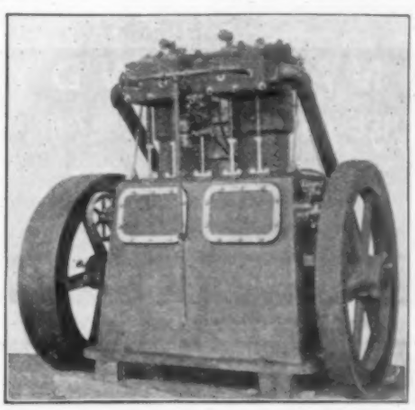

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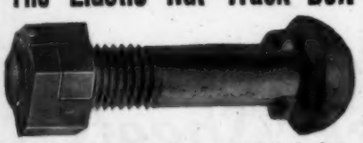

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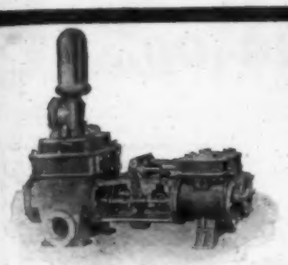

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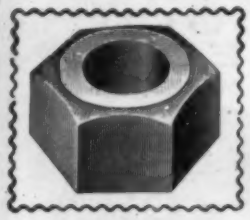

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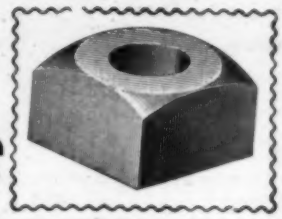

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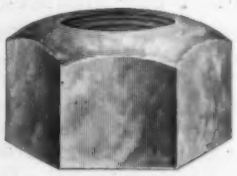

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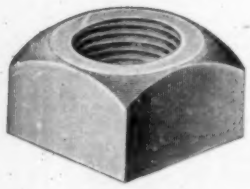

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